CCD-FX640
RMT-708

SERVICE MANUAL

US Model

video 8
Handycam

A MECHANISM

For MECHANISM ADJUSTMENTS, refer to the "8 mm Video MECHANICAL ADJUSTMENT MANUAL IV" (9-973-199-11).

SPECIFICATIONS

Video Camera Recorder

System

Video recording system:
Two rotary heads, Helical scanning FM system
Audio recording system:
Rotary heads, FM system
Video signal:
NTSC color, EIA standards
Usable cassette:
8 mm video format cassette (standard 8 mm)
Tape speed:
<SP mode> Approx. 19/32 inches (1.43 cm)/second,
<LP mode> Approx. 5/16 inches (0.72 cm)/second (playback only)
Recording time:
<SP mode> 2 hours (P6-120)
Playback time:
<SP mode> 2 hours (P6-120),
<LP mode> 4 hours (P6-120)
Fastforward/rewind time:
Approx. 6 min. 30 sec. (P6-120)
Image device:
CCD (Charge Coupled Device)
Viewfinder:
Electronic viewfinder (color)

Lens:
Combined 12 x power, Filter diameter 2 1/8 inches (52 mm), TTL autofocus system, inner focus wide macro system
Focal distance:
See the table next page.
Color temperature:
Auto
Minimum illumination:
See the table next page.
Illumination range:
See the table next page.
Recommended illumination:
More than 100 lux

Output connector

Video output:
Phono jack, 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio output:
See the next page
RFU DC OUT:
Special minijack, DC 5 V
Earphone/headphones jack:
See the next page
LANC control jack:
Stereo mini-minijack (ø 2.5 mm)
MIC jack:
See the table next page.

General

Power requirements:
On battery mounting surface
6.0 V (battery pack)
7.5 V (AC power adaptor)
Average power consumption:
See the next page
Installation:
Vertically, horizontally
Operating temperature:
32°F to 104°F
(0°C to 40°C)
Storage temperature:
–4°F to +140°F
(–20°C to +60°C)
Dimensions:
4 3/4 x 4 3/8 x 10 3/4 inches
(120 x 111 x 270 mm)
(w x h x d)
Mass:
See the table next page.
Microphone:
See the table next page.
Supplied accessories:
See page 1–1.

MICROFILM

8 VIDEO CAMERA RECORDER

SONY®

AC power adaptor

Power requirements:
110 — 240 V AC*, 50/60 Hz
Power consumption:
See the table next page.
Output voltage:
<DC OUT>
See the table next page.
<Battery charge terminal>
10 V, 1.1 A in charge mode
Application:
Sony battery packs NP-55, NP-60D, NP-C65, NP-68, NP-77H, NP-80/80D
Operating temperature:
32°F to 104°F
(0°C to 40°C)
Storage temperature:
–4°F to +140°F
(–20°C to +60°C)
Dimensions:
Approx.
4 1/8 x 1 15/16 x 2 1/2 inches
(103 x 49 x 63 mm) (w/h/d)
including projecting parts and controls
Mass:
See the table next page.

* Canadian Standard Association (CSA) certifies 120 V AC only.

Design and specifications are subject to change without notice.

		Notes
Focal distance	7/32 — 2 5/8 inches (5.4 — 64.8 mm)	9/32 — 3 1/8 inches (6.5 — 78 mm) when recording
	1 9/16 — 18 1/2 inches (39 — 468 mm)	When converted to a 35 mm still camera 1 7/8 — 22 1/4 inches (47 — 564 mm) when recording
Minimum illumination	3 lux	—
Ilumination	3 lux to 100,000 lux	—
Audio output	2 : stereo L and R	Phono jacks 327 mV, (at output impedance 47 kΩ) impedance less than 2.2 kΩ
Earphone/-headphones jack	Stereo minijack	—
MIC jack	Stereo minijack	0.388 mV low impedance with 2.5 to 3.0 V DC, output impedance 6.8 kΩ (ø 3.5 mm)
Average power consumption	5.7 W	During camera recording including the viewfinder
Mass	1 lb 15 oz (880g)	Excluding the battery pack, lithium battery, cassette and shoulder strap
	2 lb 7 oz (1,100g)	Including the battery pack NP-55, lithium battery CR2025, cassette P6-120, and shoulder strap
Microphone	Stereo type	Electret condenser microphone

AC power adaptor

	AC-V25A	AC-V25B	AC-V25C	Notes
Power consumption	17 W		18 W	—
Output voltage	7.5 V, 1.5 A		7.5 V, 1.6 A	DC OUT in operating mode
Mass (Approx.)	11 oz (320 g)	10 oz (300 g)		—

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit board Repairing
   - Keep the temperature of the soldering iron around 270°C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

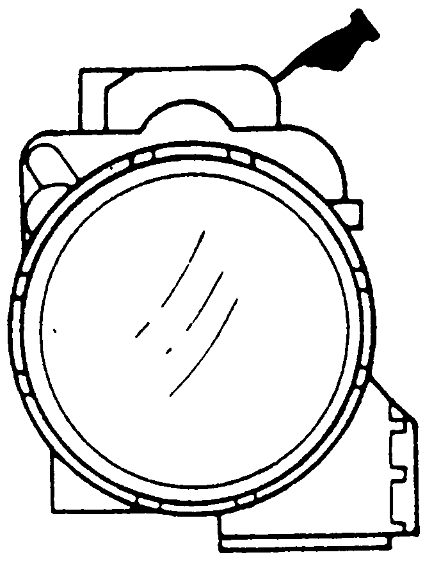
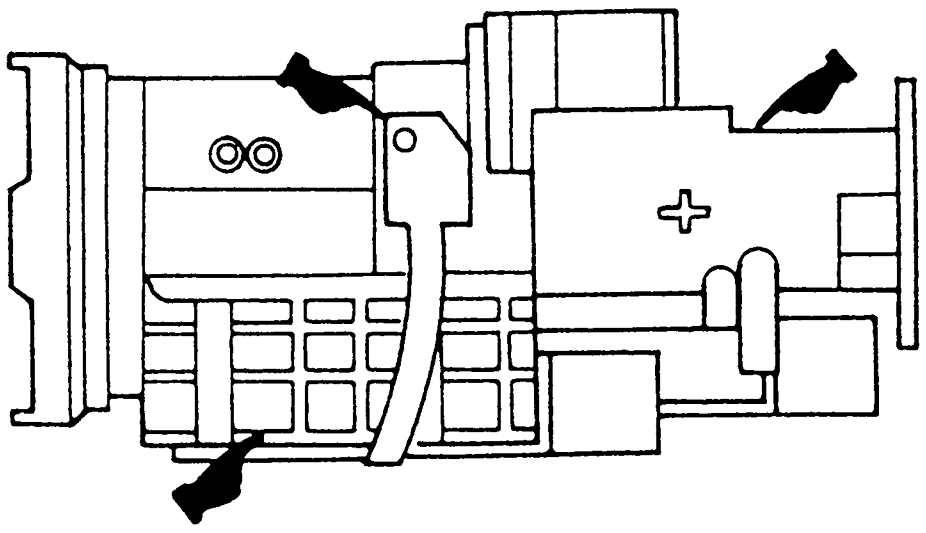
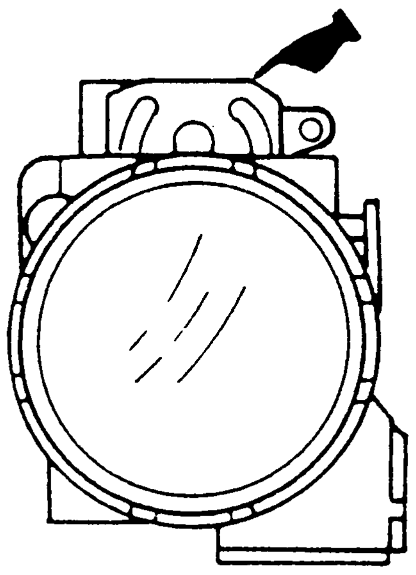
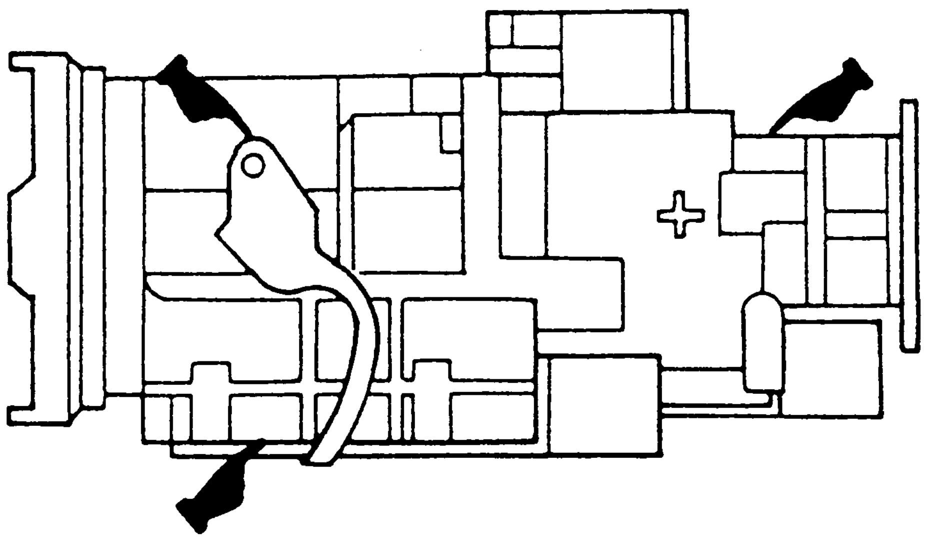
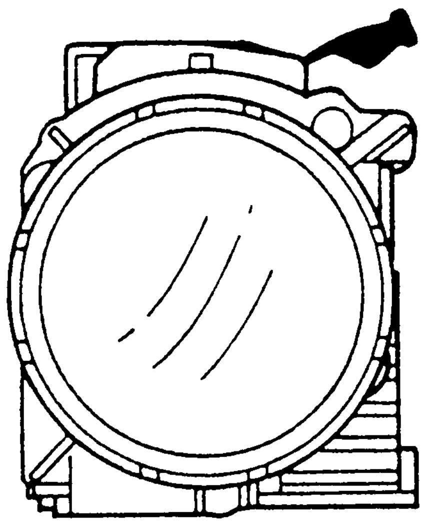
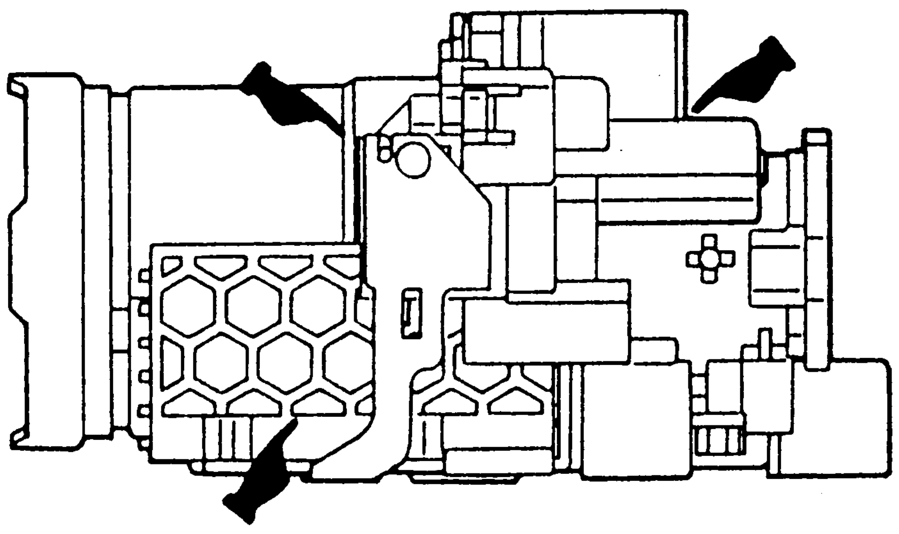
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

[Zoom lens]

This unit employs three types of lens.
Note that the lenses are interchangeable, however their components are not.

Differentiating the lens ☛ : difference point

TYPE Ⅰ (LSV-140A)	**TYPE Ⅱ (VCL-5412WA)**
From the front of the lens  From the right side of the lens (as seen from the front) 	From the front of the lens  From the right side of the lens (as seen from the front) 
TYPE Ⅲ (VCL-5412WB)	
From the front of the lens  From the right side of the lens (as seen from the front) 	

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There is the color reproduction standard frame at the back of the book.

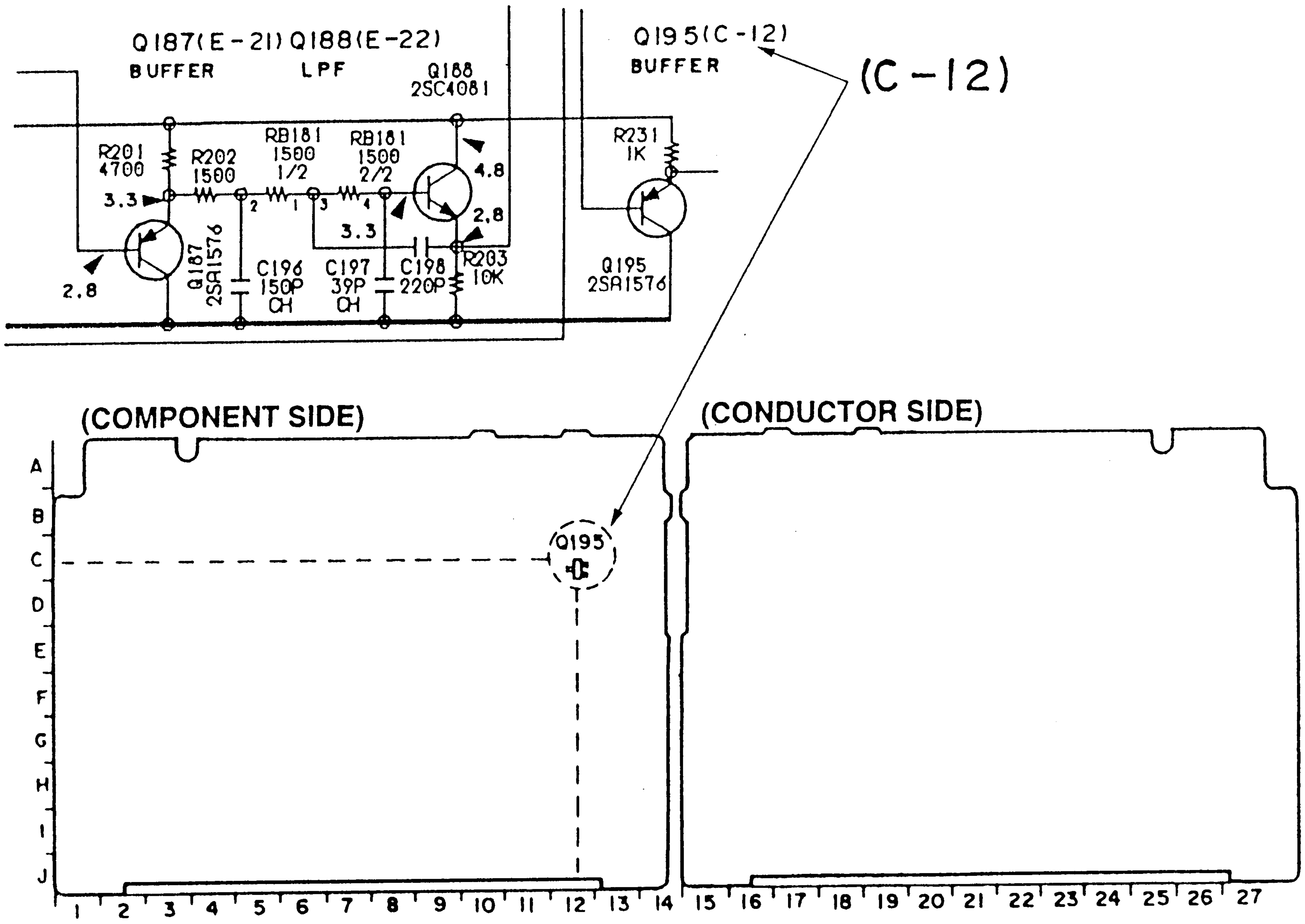
SERVICE NOTE

[ATTACH ADDRESS DISPLAY LOCATION OF ACTUAL SIZE]

In this manual, the mounted locations of all electrical parts in boards are mentioned in blank space of the printed wiring boards. The location display of actual size is attached under the color reproduction frame at the end of this service manual. It will be available if you take a copy of this to a clear sheet.

[SEMICONDUCTOR LOCATION]

In this service manual, the mounted locations of the semiconductors (IC, transistor, diodes) are indicated in red in schematic diagrams. This enables to find the location on the board easily when servicing.



Q187(E-21) Q188(E-22)
BUFFER
LPF
Q188
2SC4081
Q195(C-12)
BUFFER
(C-12)
R201
4700
R202
1500
RB181
1500
1/2
RB181
1500
2/2
4.8
2.8
3.3
3.3
2.8
Q187
2SA1576
C196
150P
CH
C197
39P
CH
C198
220P
R203
10K
R231
1K
Q195
2SA1576
(COMPONENT SIDE)
(CONDUCTOR SIDE)
Q195
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[HEAD CLEANING]

After an extended period of use the video image may become indistinet or may not appear at all during playback of a tape. The cause of this usually are dirty video heads. For remedy, cleaning of the heads is required.

Check for Head Clogs During Recording

① Use a blank tape, record a short section, then press the stop button to stop.

② Set to recording mode again.

③ If the [✖] mark is flashing in the viewfinder at this time, head clogs are occurred.

Check During Playback of a Tape

① Play back a pre-recorded tape and display the image on a TV screen.

② If there is no sound and the image is unstable, no image appears on the screen, or tape transport is unstable, head clogs are occurred.

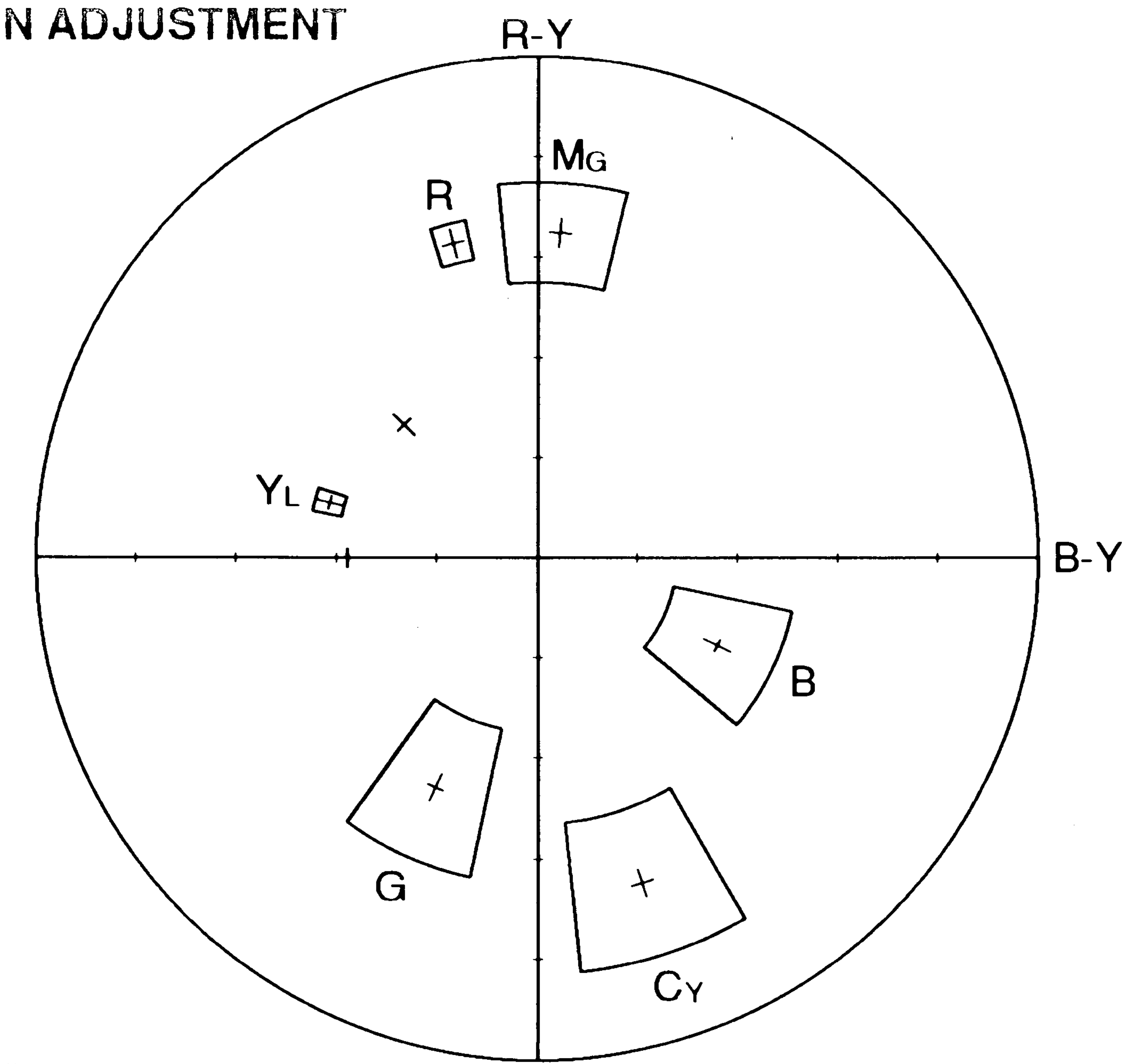
Remedy

[Cleaning method using a cleaning tape]

- Use the Cleaning Tape. (Please follow the instructions attached to the cleaning tape.)

FOR CAMERA COLOR REPRODUCTION ADJUSTMENT

Take a copy of CAMERA COLOR REPRODUCTION FRAME and Parts reference sheets with a clear sheet for use.



R-Y
B-Y
MG
R
YL
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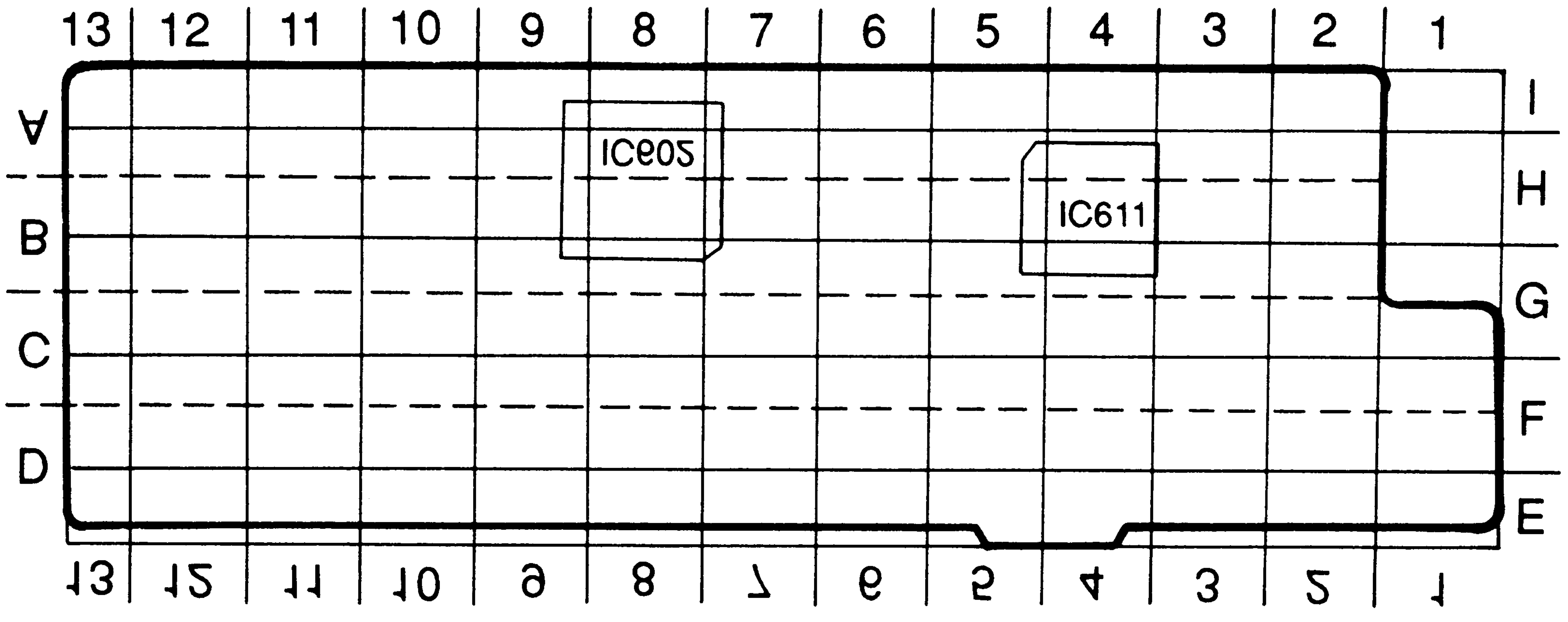
CY

CCD-FX640

PARTS REFERENCE SHEET>

You can find the parts position of mount locations applying to boards of a set.

VC-142 BOARD (CONDUCTOR SIDE)



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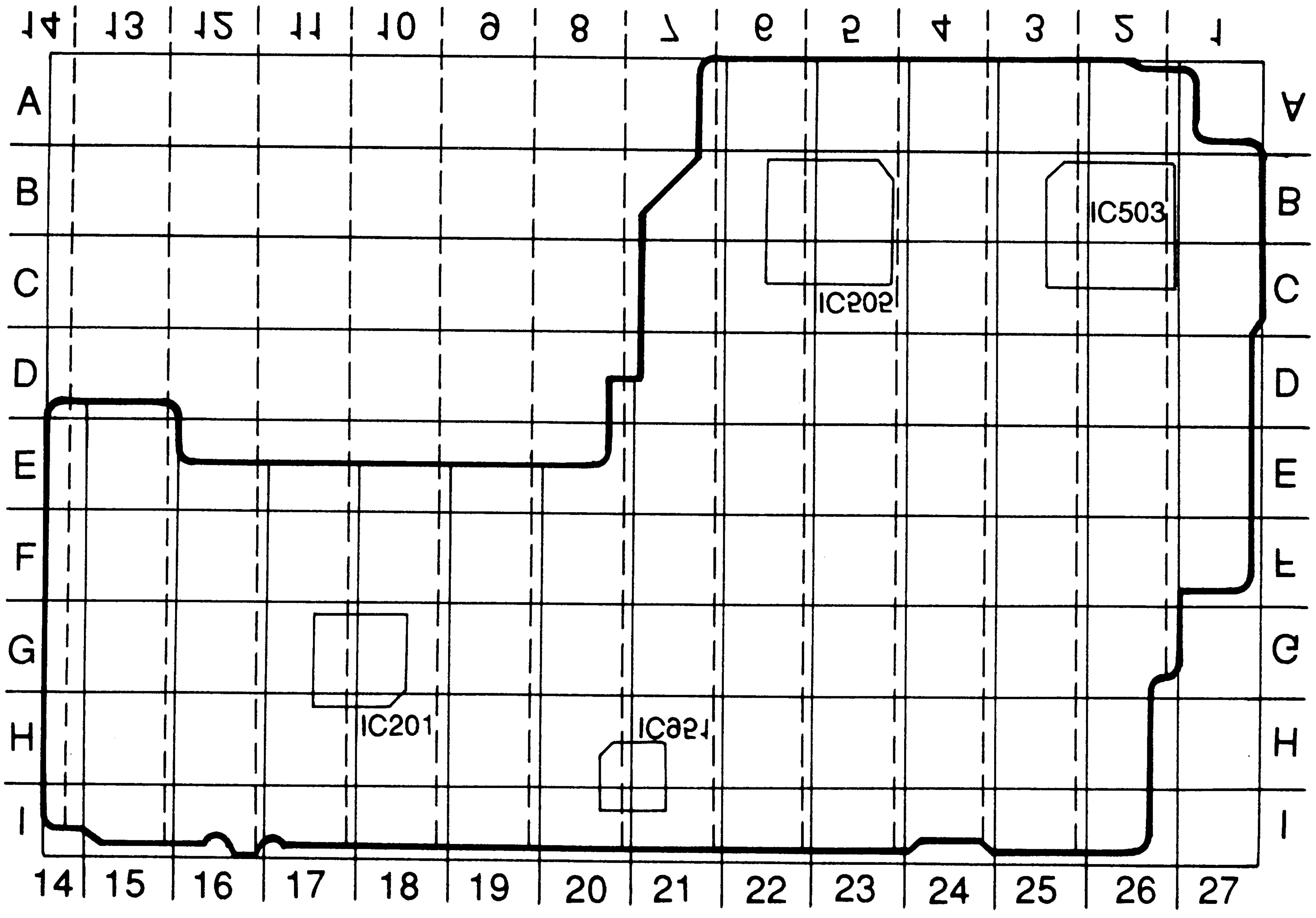
E
IC602
IC611

VC-142 BOARD (COMPONENT SIDE)

CCD-FX640

VS-111 BOARD (COMPONENT SIDE)



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IC503
IC505
IC201
IC651
15
16
17
18
19
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VS-111 BOARD (CONDUCTOR SIDE)

CCD-FX640

English
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Quality Engineering Dept.

Sony Corporation
Consumer A&V Products Company
Personal A&V Products Div.

Before You Begin

Checking Your Model Number

The instructions in this manual are for the three models listed below. Before you start reading this manual and operating the unit, check your model number by looking at the bottom of your camcorder. The CCD-FX240 is the model used for illustration purposes. Otherwise, the model name is indicated in the illustrations. Any differences in operation are clearly indicated in the text, for example, "CCD-FX340 only." As you read through this manual, buttons and settings on the camcorder are shown in capital letters. e.g. "Set the POWER switch to CAMERA."

Types of differences

Model number	Viewfinder		Audio		Steady Shot	Digital Zoom (24x)	Beep	Manual Focus
	Monochrome	Color	Monaural	Stereo				
CCD-FX240	●		●					
CCD-FX340		●	●					
CCD-FX640		●		●	●	●	●	●

Note on TV Color Systems

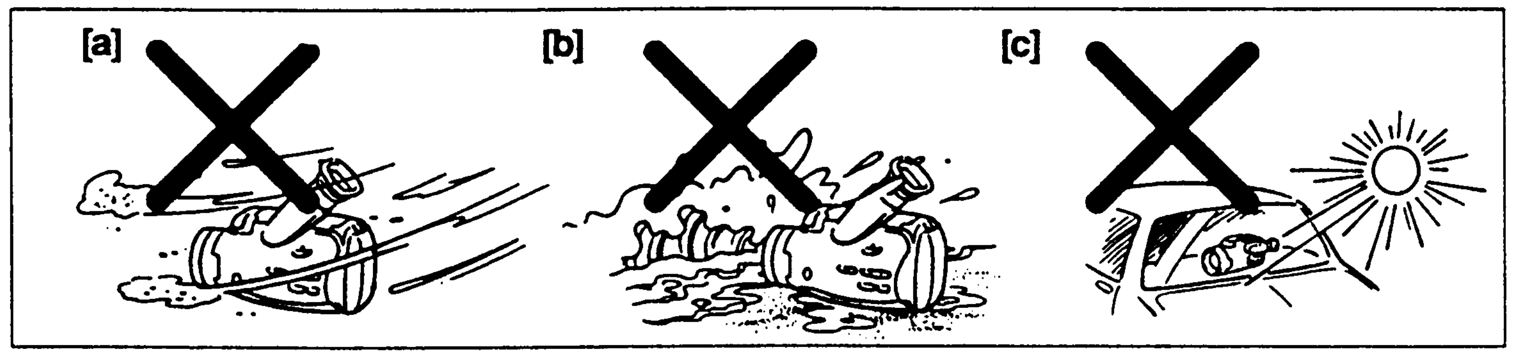
TV color systems differ from country to country. To view your recordings on a TV, you need an NTSC system-based TV. When you want to use a PAL-M system-based TV, you will need an NTSC/PAL-M transcoder (as this is an NTSC system based camcorder). Please check the list on page 41 to find out the TV color system used in your country.

Precaution on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

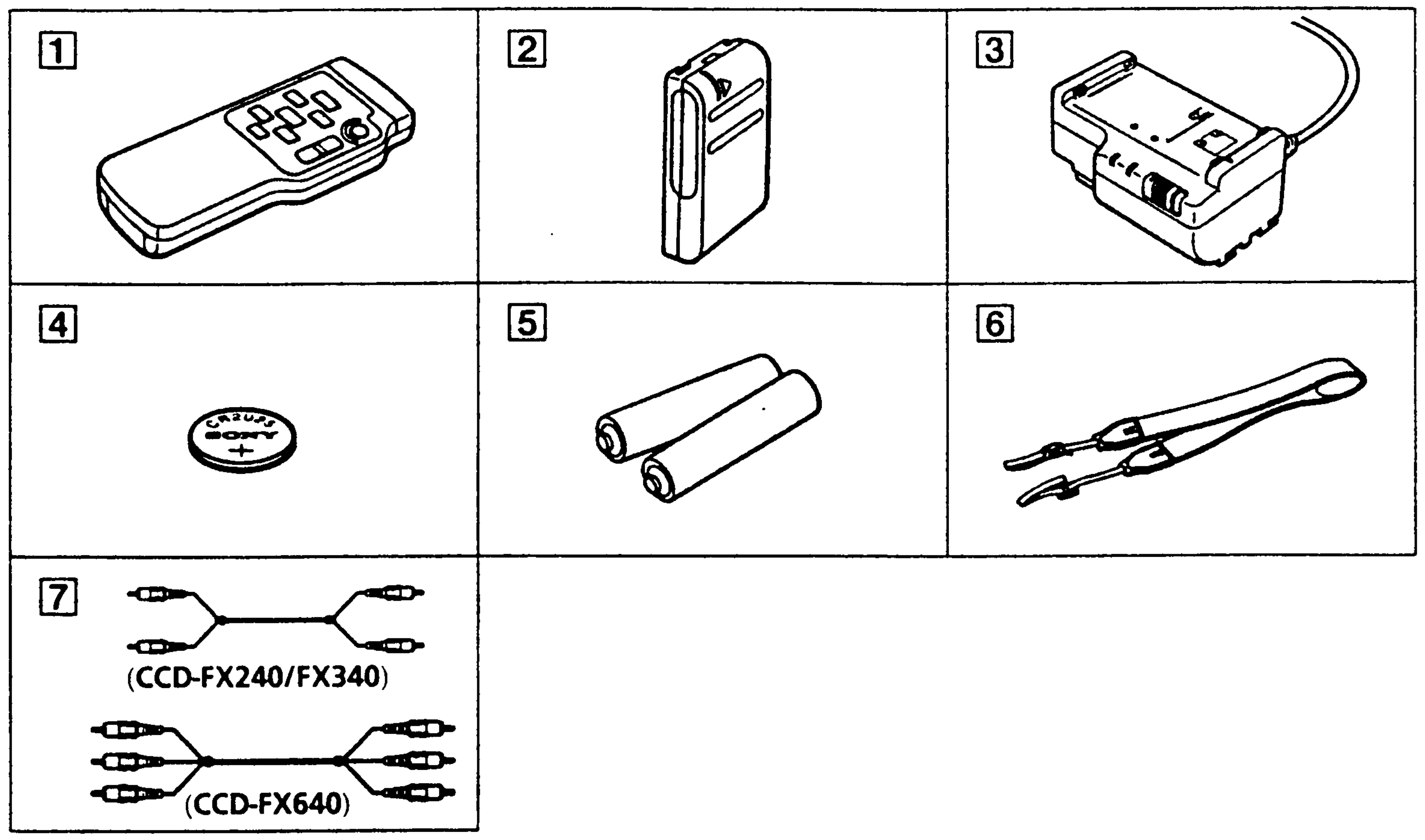
Precautions on Camcorder Care

- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired [a].**
- **Do not let the camcorder get wet. Keep the camcorder away from rain and sea water. Letting the camcorder get wet may cause the unit to malfunction and sometimes the malfunction cannot be repaired [b].**
- **Never leave the camcorder exposed to temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight [c].**



Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.



1 **Wireless Remote Commander** (1) (p. 51)

2 **NP-55 Battery pack** (1) (p. 6)

3 **AC-V25A/V25B/V25C AC power adaptor** (1) (p. 6, 19)

4 **CR2025 Lithium Battery** (1) (p. 33)
(The lithium battery is already installed in your camcorder.)

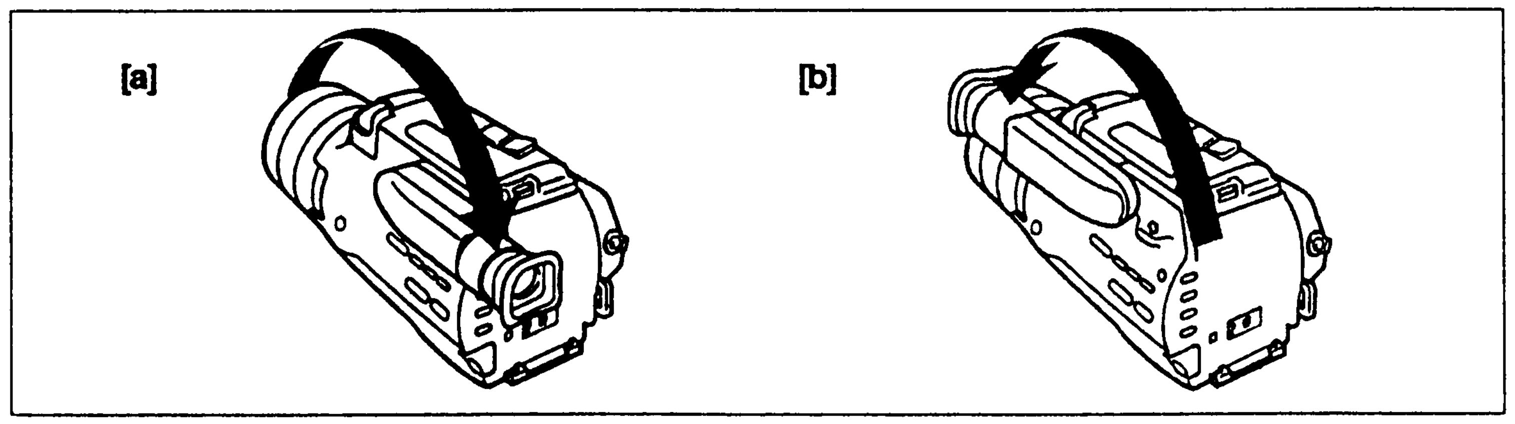
5 **Size AA (R6) battery for Remote Commander** (2) (p. 51)

6 **Shoulder strap** (1) (p. 49)

7 **A/V connecting cable (monoral) (CCD-FX240/FX340)** (1) (p. 16)
A/V connecting cable (stereo) (CCD-FX640 only) (p. 16)

After Taking the Camcorder out of the Box

Turn the viewfinder barrel in the direction of the arrow **[a]**. When storing your camcorder, turn the viewfinder barrel in the direction of the arrow **[b]**.



SECTION 1
GENERAL

This section is extracted from CCD-FX240/FX340/FX640 instruction manual.

Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V25A/V25B/V25C AC power adaptor.

Charging the Battery Pack

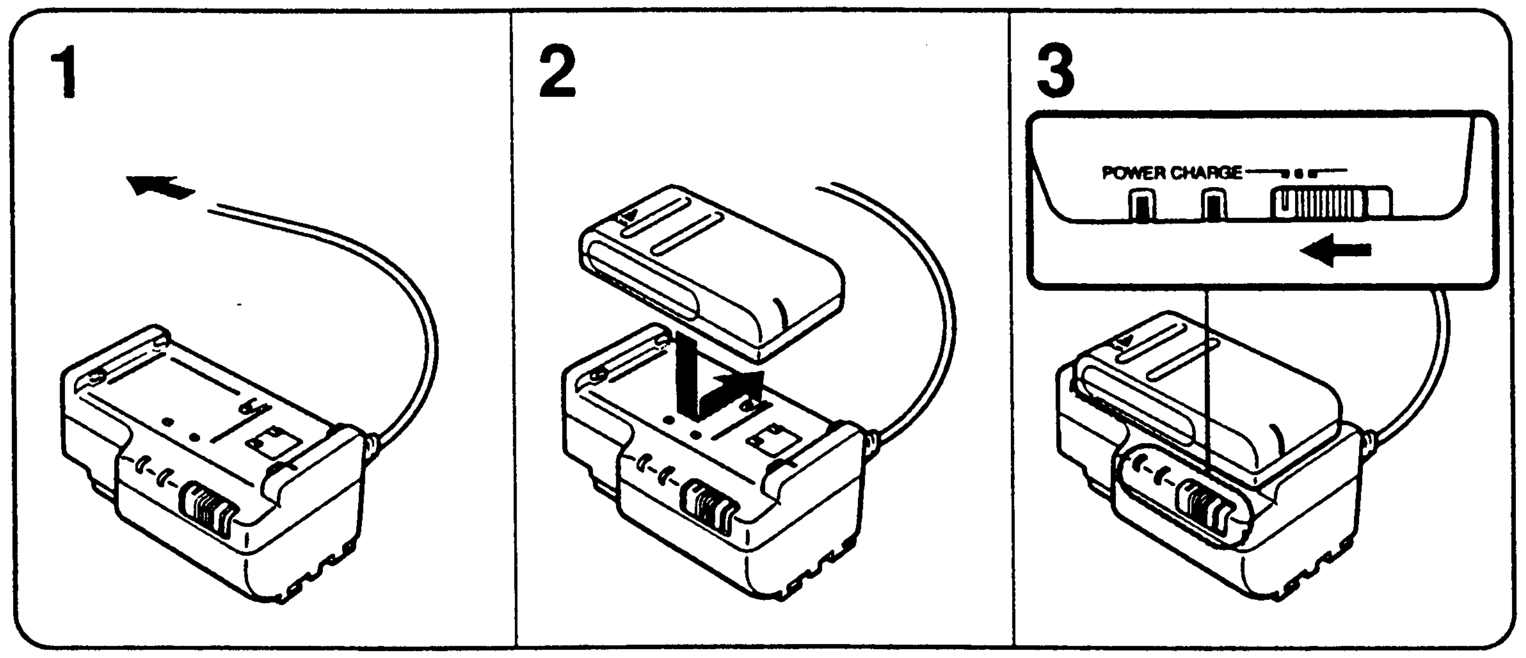
Charge the battery pack on a flat surface without vibration.

(1) Connect the power cord to a wall outlet.

(2) Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow.

(3) Set the selector to CHARGE. The CHARGE lamp (orange) lights up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Set the selector to the center position and unplug the unit from the wall outlet. Then remove the battery pack and install it on the camcorder.
To stop charging, set the selector to the center position.



Charging Time

Battery pack	NP-55 (supplied)	NP-60D	NP-C65	NP-68	NP-77H	NP-80 NP-80D
Charging time*	70	90	105	125	170	190

* Approximate minutes to charge an empty battery pack using the AC-V25A/V25B/V25C (Lower temperatures require a longer charging time.)

Battery Life

CCD-FX240

Battery pack	NP-55 (supplied)	NP-60D	NP-C65	NP-68	NP-77H	NP-80 NP-80D
Typical recording time**	30	45	50	60	85	90
Continuous recording time***	65	85	95	120	165	170

CCD-FX340

Battery pack	NP-55 (supplied)	NP-60D	NP-C65	NP-68	NP-77H	NP-80 NP-80D
Typical recording time**	30	40	45	60	80	85
Continuous recording time***	60	80	90	115	155	165

CCD-FX640

Battery pack	NP-55 (supplied)	NP-60D	NP-C65	NP-68	NP-77H	NP-80 NP-80D
Typical recording time**	25	35	40	55	70	75
Continuous recording time***	55	70	80	105	140	145

** Approximate minutes when recording while you repeat recording start/stop or zooming and turning the power on/off. The actual battery life may be shorter.

*** Approximate continuous recording time indoors.

Important!

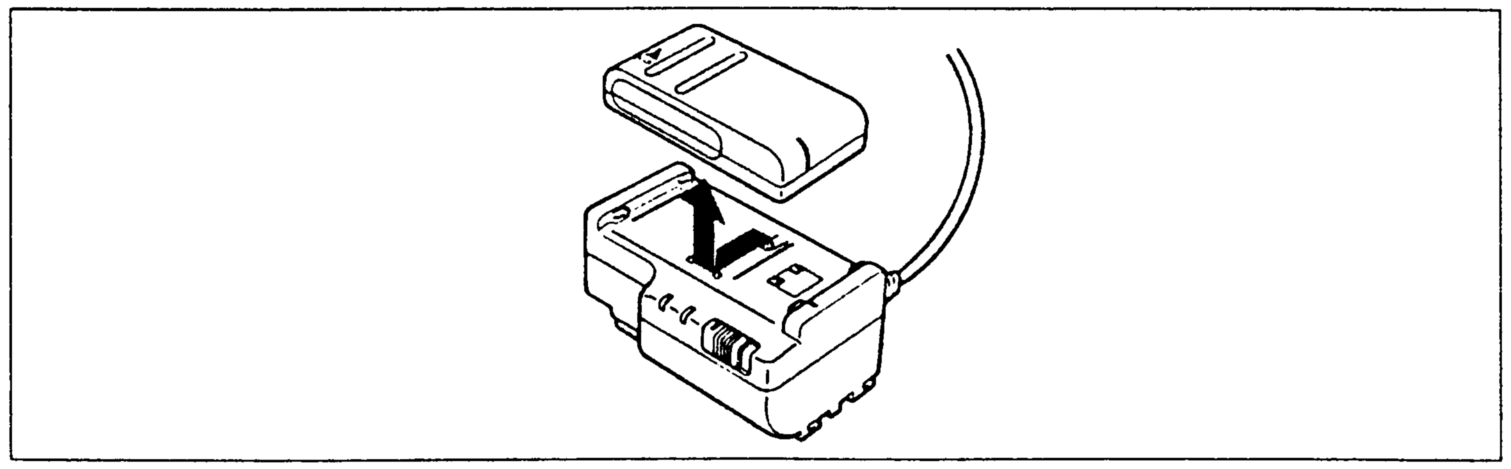
Use the battery completely before re-charging!

Before you recharge the battery pack, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and slide the POWER switch to CAMERA with the battery pack attached, and leave the camcorder until the ▭ indicator flashes and the red lamp flashes rapidly in the viewfinder.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow (see drawing).



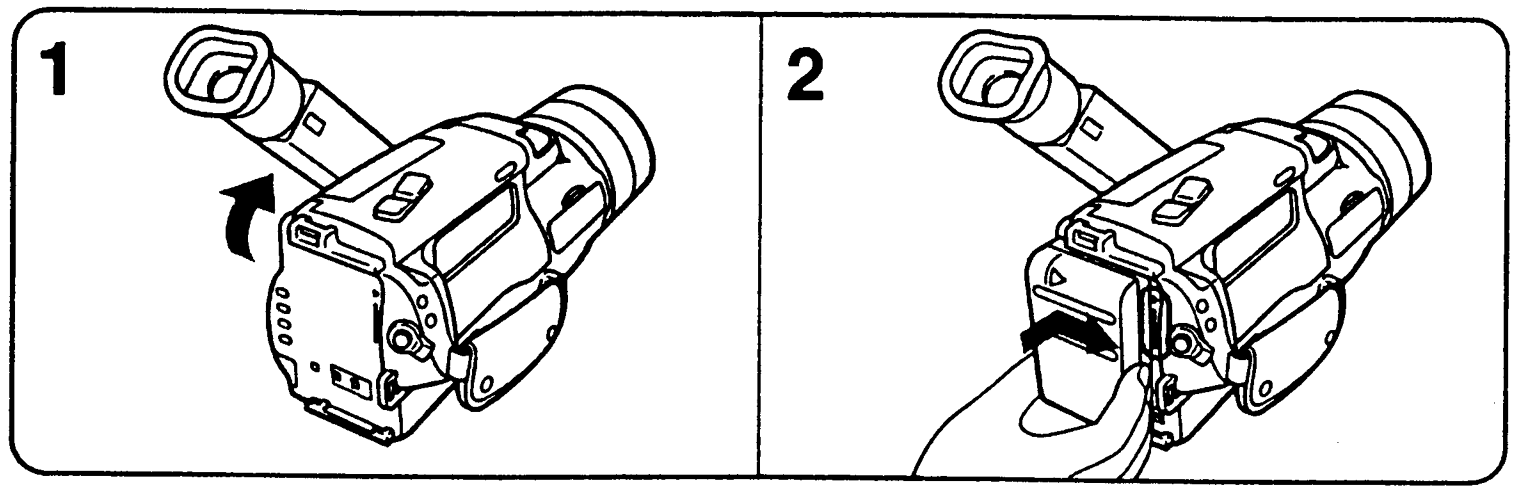
Note on charging the battery pack

- The POWER lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

Charging and Installing the Battery Pack

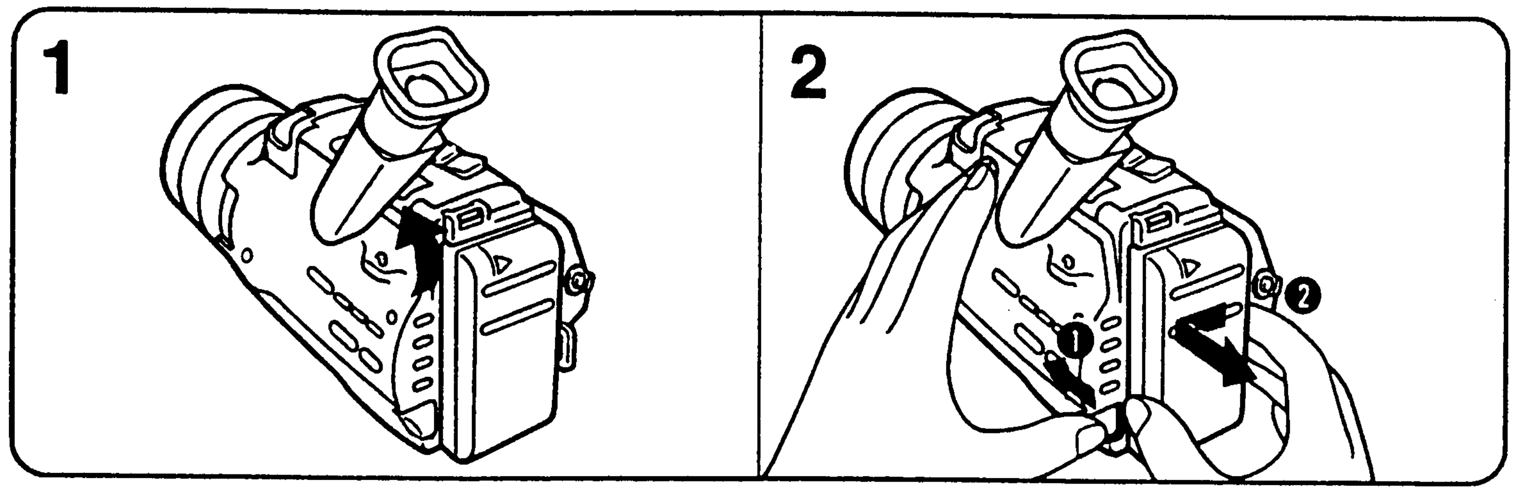
Installing the Battery Pack

(1) Lift up the viewfinder.
(2) Align the right side of the battery pack with the white line on the camcorder, and slide the battery pack to the right.



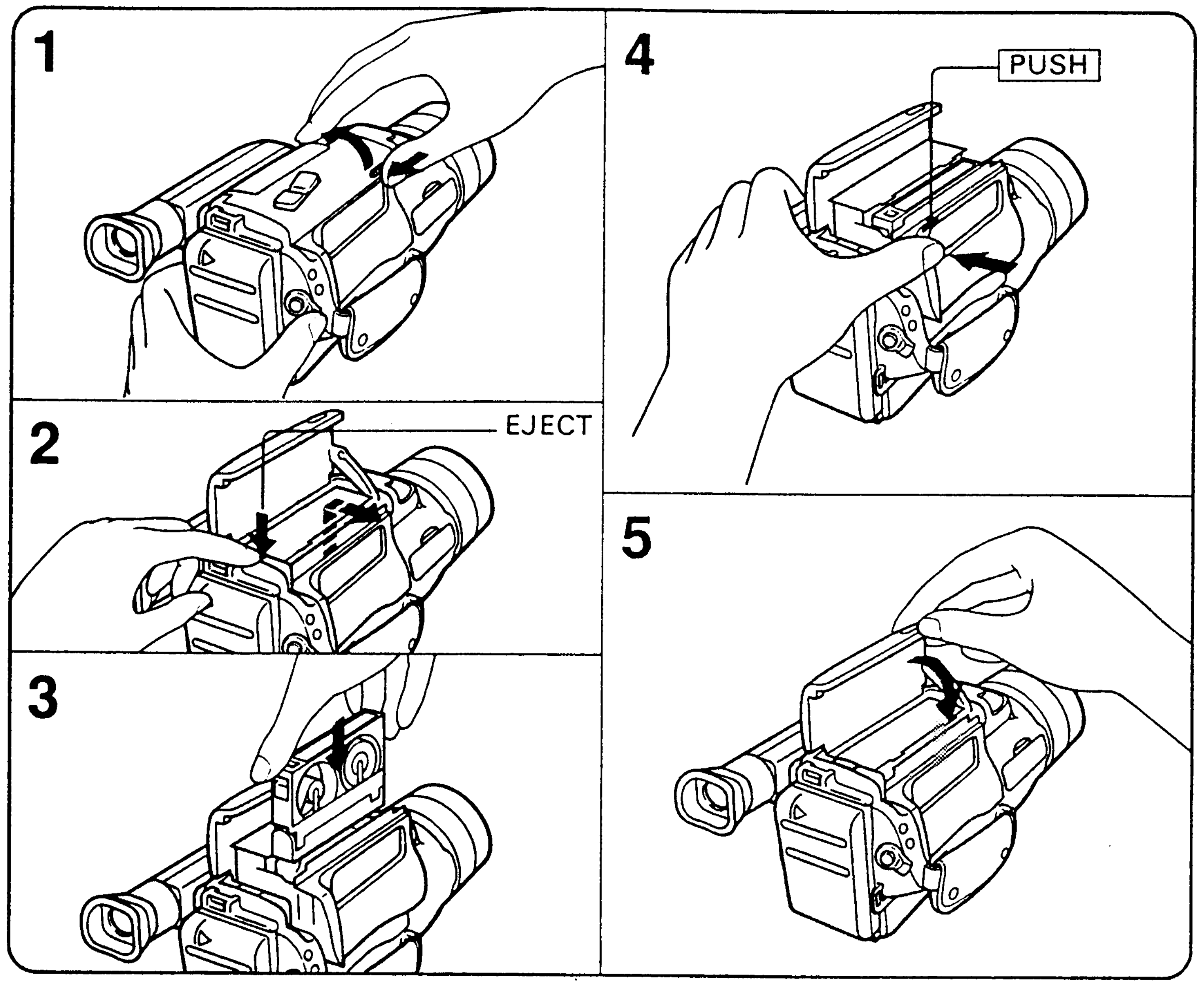
Removing the Battery Pack

(1) Lift up the viewfinder.
(2) While pressing BATT, slide the battery pack to the left.



Inserting a Cassette

Make sure that the power source is installed.
(1) While sliding the lid lock in the direction of the arrow, lift up the lid.
(2) Press EJECT. The cassette compartment automatically lifts up and opens.
(3) Insert a cassette with the window facing out.
(4) Close the cassette compartment by pressing the "PUSH" mark on the cassette compartment.
(5) Close the lid.

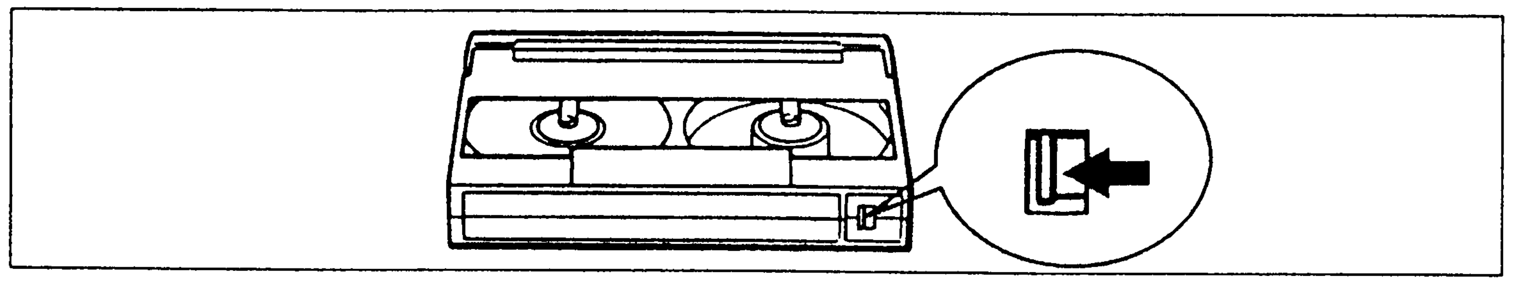


To Eject the Cassette

While sliding the lid lock in the direction of the arrow, lift up the lid of the cassette holder and press EJECT.

Preventing Accidental Erasure

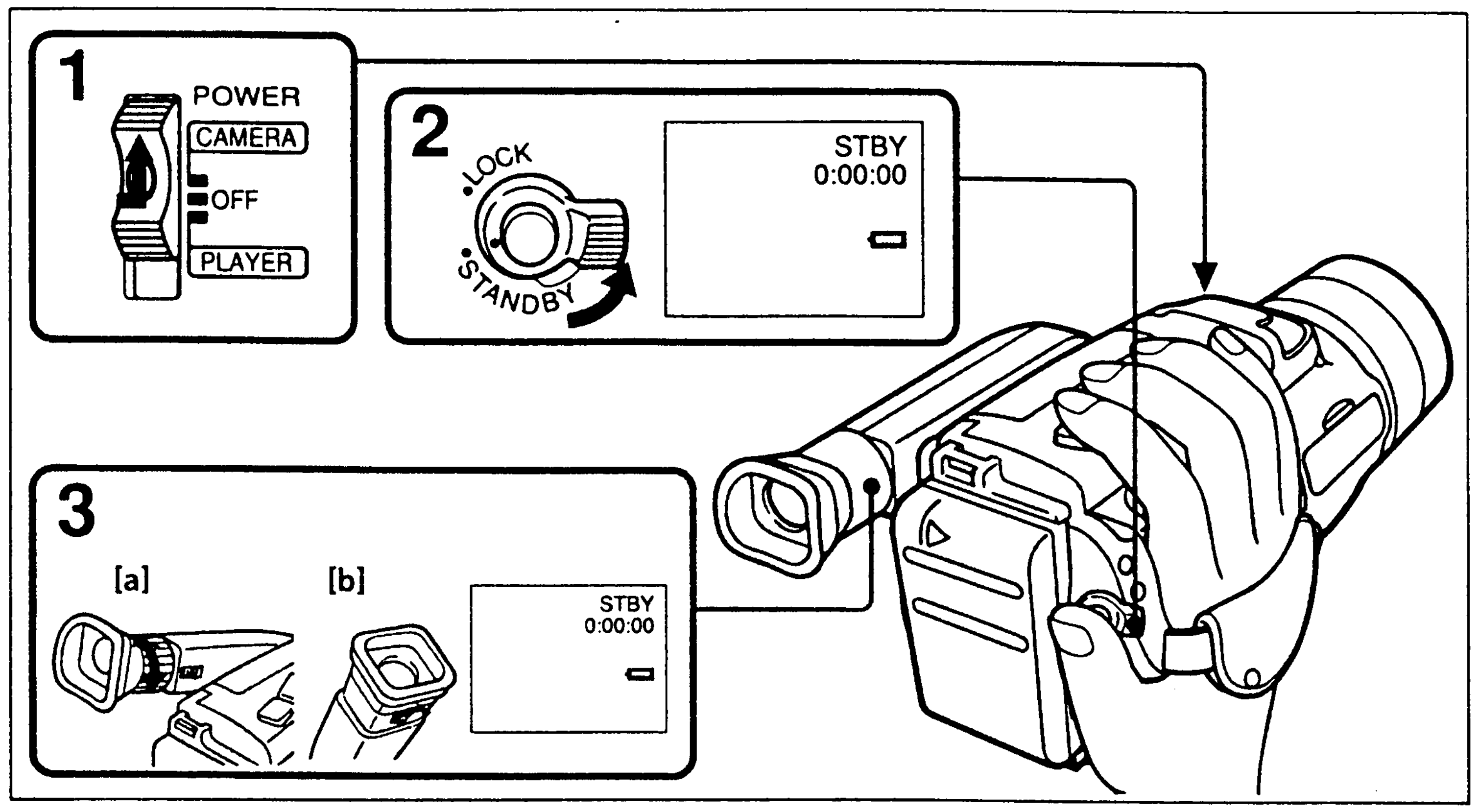
To prevent accidental erasure, slide the tab on the cassette to expose the red mark. If you try to record with the red mark exposed, the ▣ and ▲ indicators flash in the viewfinder, and you cannot record.
To re-record on this tape, slide the tab back out covering the red mark.



Adjusting the Viewfinder Lens

Before you use the camcorder for the first time or after someone else has used it, focus the viewfinder lens. Make sure that the power source is attached to the camcorder.

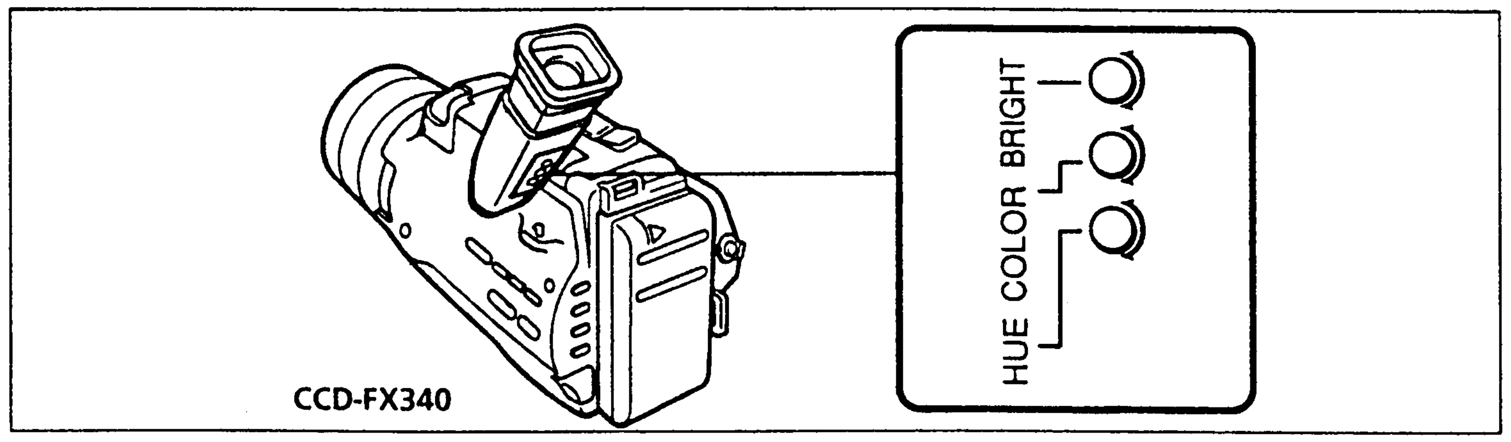
(1) While pressing the small green button on the POWER switch, slide it to CAMERA. The lens cover opens.
(2) Turn STANDBY up. You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).
(3) Focus on the indicators: **[a]** When using a monochrome viewfinder, turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus. **[b]** When using a color viewfinder, move the viewfinder lens adjustment lever so that the indicators in the viewfinder come into sharp focus.



When Using a Color Viewfinder — For CCD-FX340/FX640

To adjust the picture quality

If you want to change hue, color and brightness of the picture displayed on the viewfinder screen, turn the screws on the viewfinder slowly using a screwdriver (not supplied). You do not need to adjust them in everyday operation.



	Turn clockwise	Turn counterclockwise
BRIGHT	More brightness	Less brightness
COLOR	More color intensity	Less color intensity
HUE	Greenish skin tones	Reddish skin tones

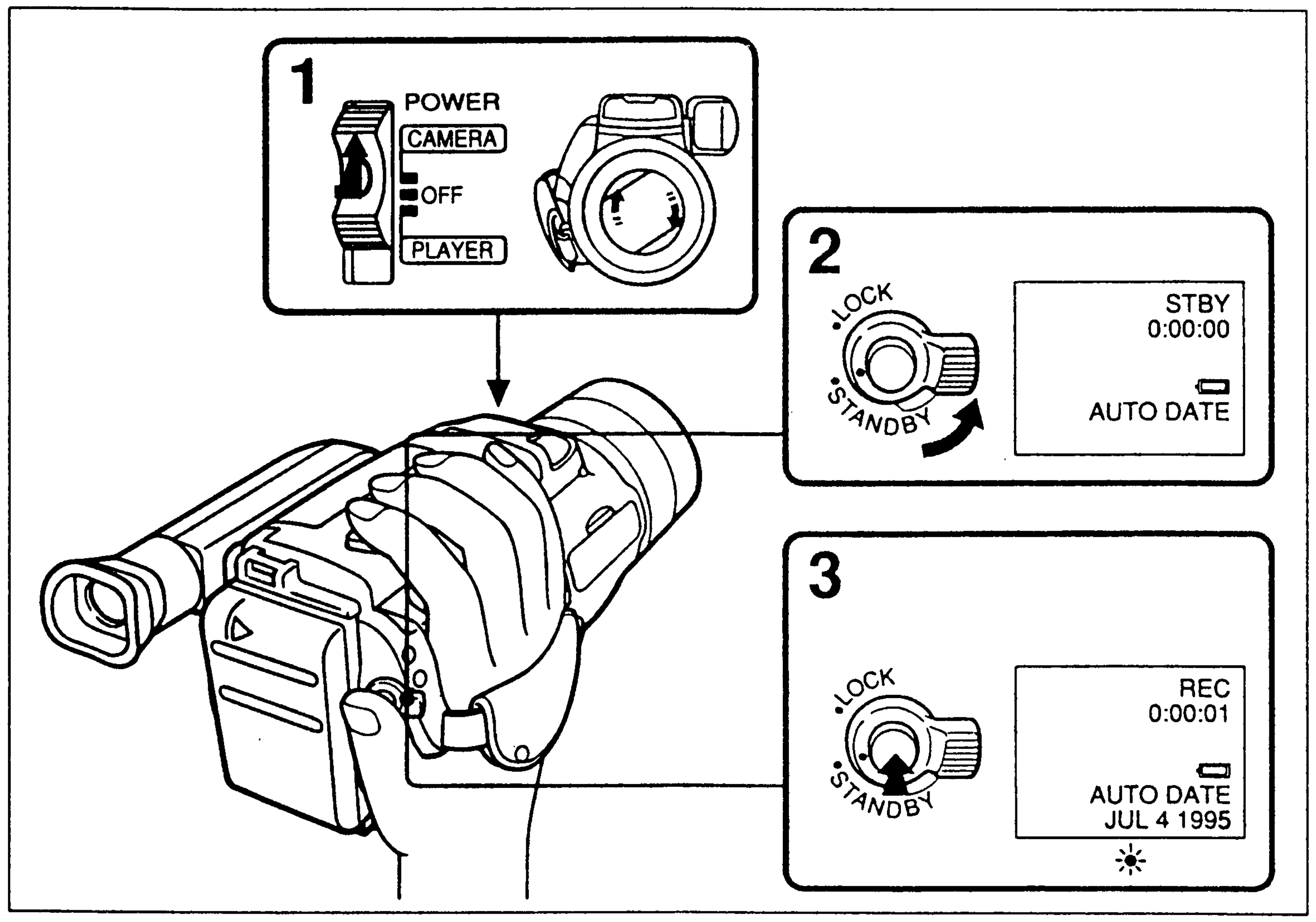
Camera Recording

Make sure that the power source is installed and a cassette is inserted. The date is automatically recorded for 10 seconds after you start recording (AUTO DATE feature). This feature works only once a day.

You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).

Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working correctly.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA.
(2) Turn STANDBY up.
(3) Press START/STOP. The camcorder starts recording. The "REC" indicator appears and the red lamp lights up in the viewfinder. The camera recording/battery lamp on the viewfinder barrel also lights up.

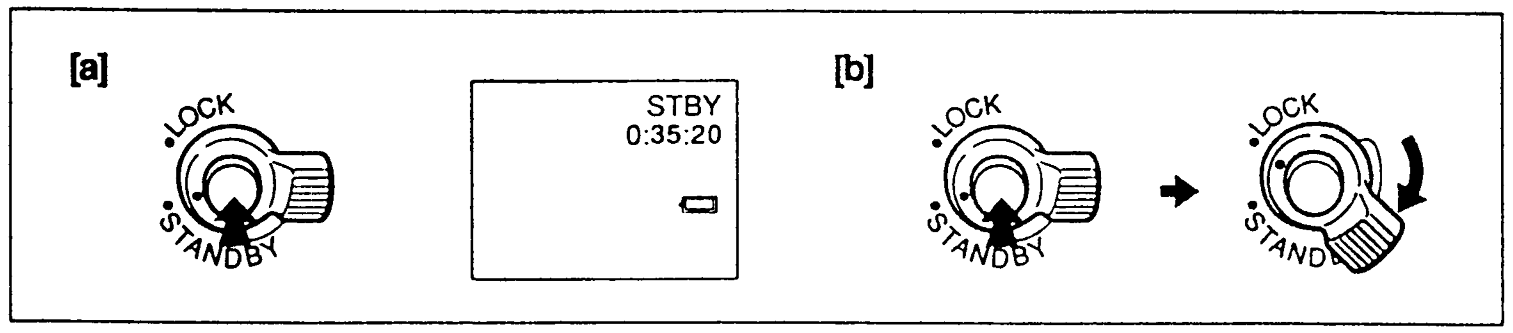


To Stop Recording Momentarily [a]

Press START/STOP again. The "STBY" indicator appears in the viewfinder (**Standby mode**).

To Finish Recording [b]

Press START/STOP again. Turn STANDBY down and slide the POWER switch to OFF. The lens cover closes. Then, eject the cassette (p. 9) and remove the battery (p. 8).



(See next page for further information)

Note on Standby mode

If you leave the camcorder in Standby mode for 5 minutes while the cassette is inserted, the camcorder turns off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on recording

When you record from the beginning of a tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape.
You can record tapes in SP (standard play) mode only.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET.

Note on beep sound (CCD-FX640 only)

A beep sounds when you turn the power on or when you start recording and two beeps sound when you stop recording, confirming the operation. Several beep also sound as a warning of any unusual condition of the camcorder (p. 53)
Note that the beep sound is not recorded on the tape. If you do not want to hear the beep sound, select "OFF" in the menu system.

Note on the AUTO DATE feature

The clock is set to the East Coast Standard Time at the factory, but you can reset the clock in the menu system (p. 34). You can change the AUTO DATE settings by selecting ON or OFF in the menu system.
The AUTO DATE feature works once a day. However, the date may automatically appear more than once a day when:

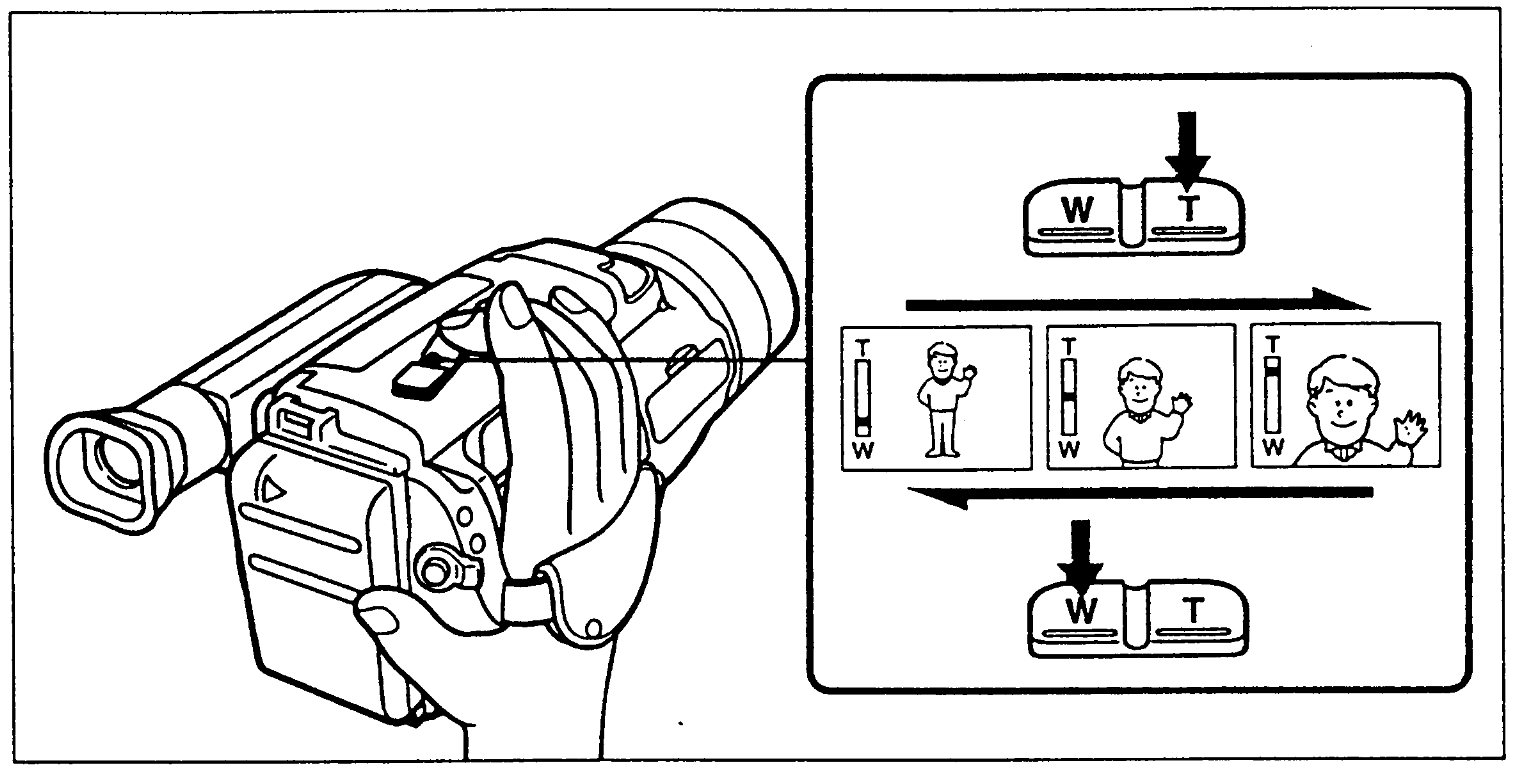
- you reset the date and time.
- you eject and insert the tape again.
- you stop recording within 10 seconds.
- you set AUTO DATE to OFF once and set to ON again in the menu system.

When moving from indoors to outdoors (or vice versa)

Turn STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene.
For more professional-looking recordings, use the zoom function sparingly.
"T" side: for telephoto (subject appears closer)
"W" side: for wide-angle (subject appears farther away)



Zooming Speed (Dual speed zooming)

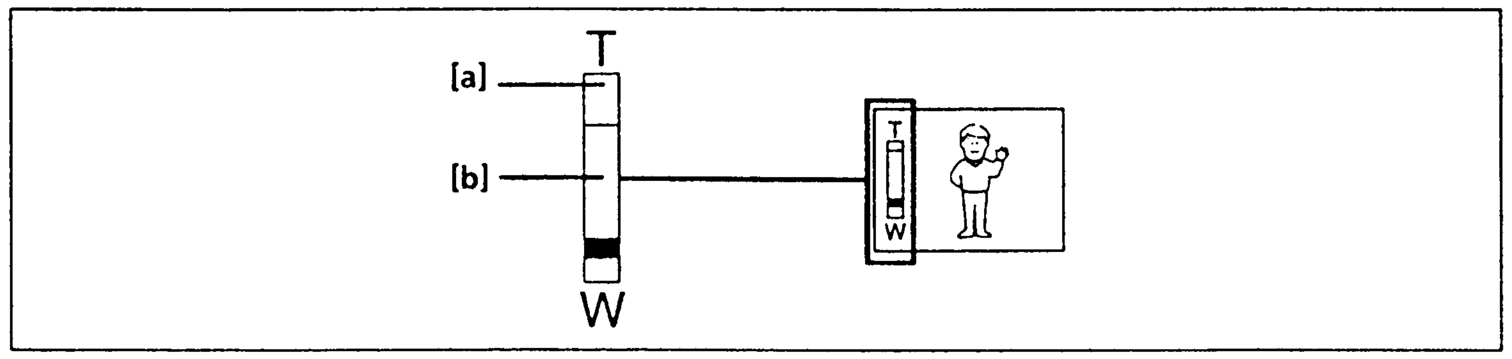
Press the power zoom button firmly for a high-speed zoom, press it softly for a relatively slow zoom.

When you shoot a subject using a telephoto zoom

If you cannot get a sharp focus while in extreme telephoto zoom, press the "W" side of the power zoom button until the focus is sharp. You can shoot a subject that is at least about 3 1/4 feet (100 cm) away from the lens surface in the telephoto position, or about 1/2 inches (1 cm) in the wide-angle position.

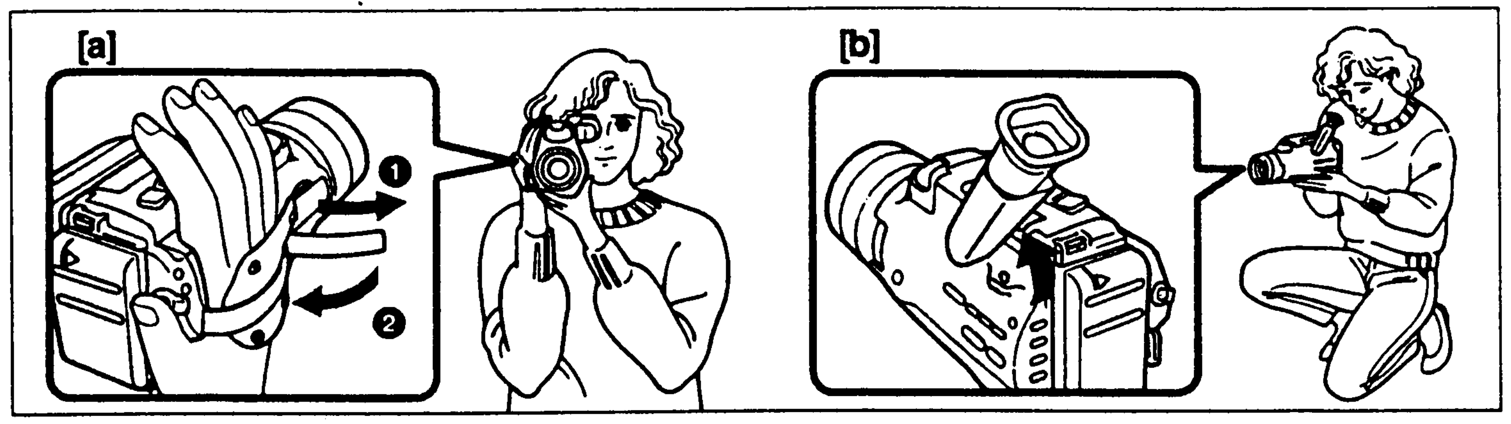
Notes on Digital Zoom (CCD-FX640 only)

- More than 12x zoom is performed digitally, and the picture quality deteriorates as you go toward the T side. If you do not want to use the digital zoom, set the D ZOOM function to OFF in the menu system (p. 31).
- The horizontal bar in the power zoom indicator separates the digital zooming zone (above the bar **[a]**) and the optical zooming zone (under the bar **[b]**). If you set the D ZOOM function to OFF, the part above the bar disappears.



Hints for Better Shooting

For hand-held shots, you'll get better results by holding the camcorder according to the following suggestions:



- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb **[a]**.
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Lift the viewfinder up for recording from a low position. (You can turn it to 180 degrees.) **[b]**

Place the camcorder on a flat surface or use a tripod

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 48). When attaching a non-Sony tripod, make sure that the length of the tripod screw is less than 9/32 in (6.5 mm). Otherwise, the screw may damage the inner parts of the camcorder.

Using the Viewfinder as a Sports Finder — CCD-FX240 only

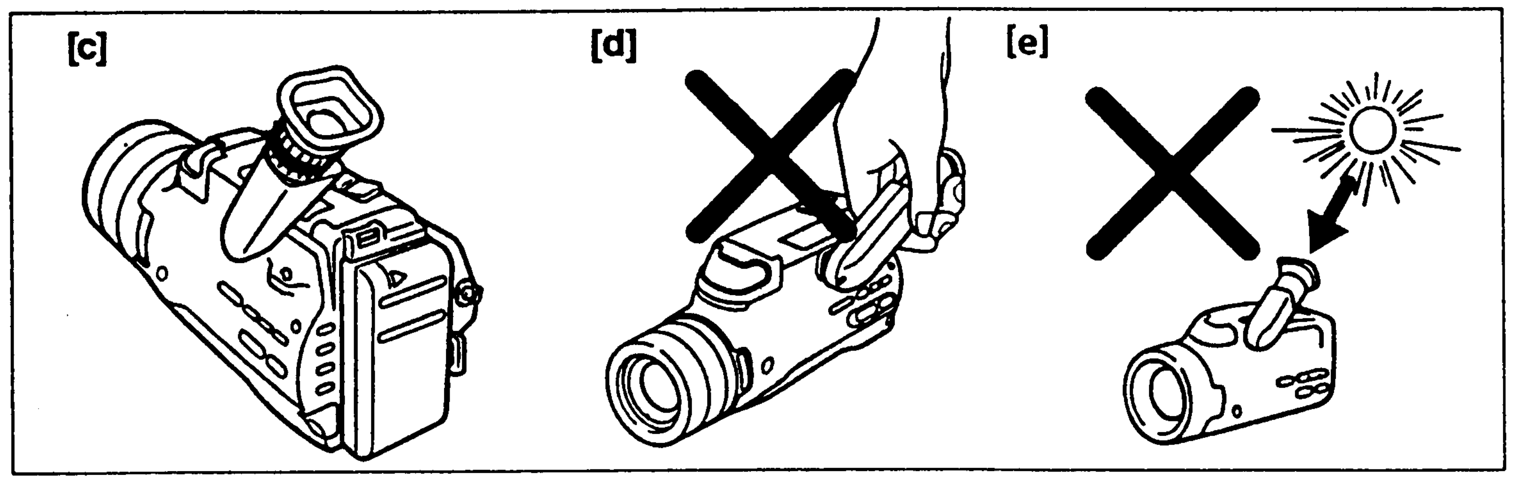
With the Sports Finder, you can monitor the picture while your eyes are at a distance from the eyecup. You can shoot scenes while moving around.

When using the viewfinder as a Sports Finder, turn the viewfinder lens adjustment ring clockwise until it stops **[c]**.

When returning to the normal viewfinder position, turn the viewfinder lens adjustment ring counterclockwise until the indicators in the viewfinder come into sharp focus.

Cautions on the viewfinder

- Do not pick up the camcorder by the viewfinder **[d]**.
- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be deformed. Be careful when placing the camcorder under sunlight or by the window **[e]**.



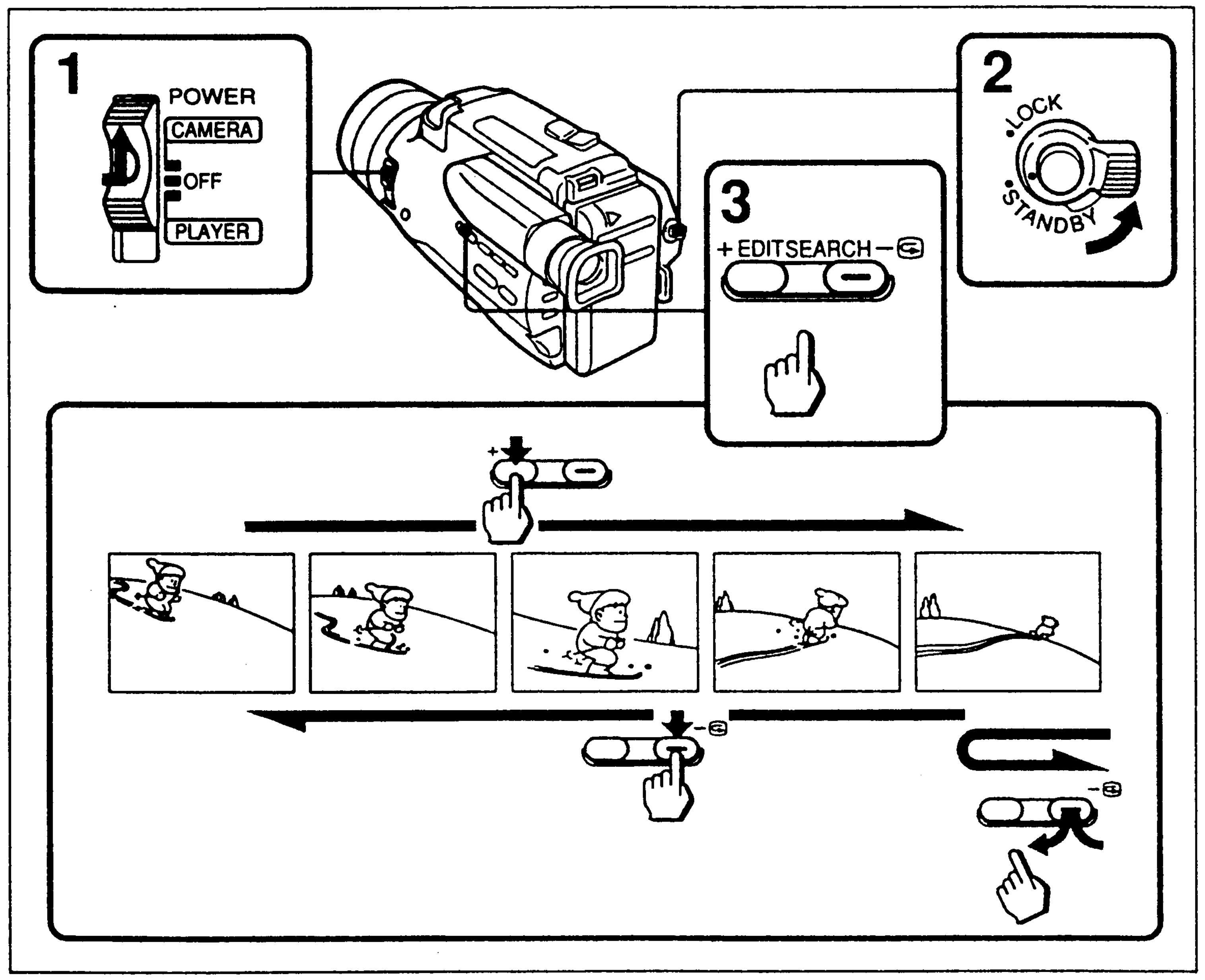
Checking the Recorded Picture

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA.

(2) Turn STANDBY up.
You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).

(3) Press the – (⊜) side of EDITSEARCH momentarily; the last few seconds of the recorded portion plays back (**Rec Review**).
You can also monitor the sound by using an earphone/headphones (not supplied).
Hold down the – side of EDITSEARCH until the camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the + side (**Edit Search**).



To Stop Playback

Release EDITSEARCH.

To Begin Re-recording

Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the tape, the transition between the last scene you recorded and the next scene you record will be smooth.

Monitoring the Sound while Viewing the Playback Picture in the Viewfinder

Connect an earphone/headphones (not supplied) to the ◎ /∩ jack.
Play back the tape in PLAYER mode (p. 17).

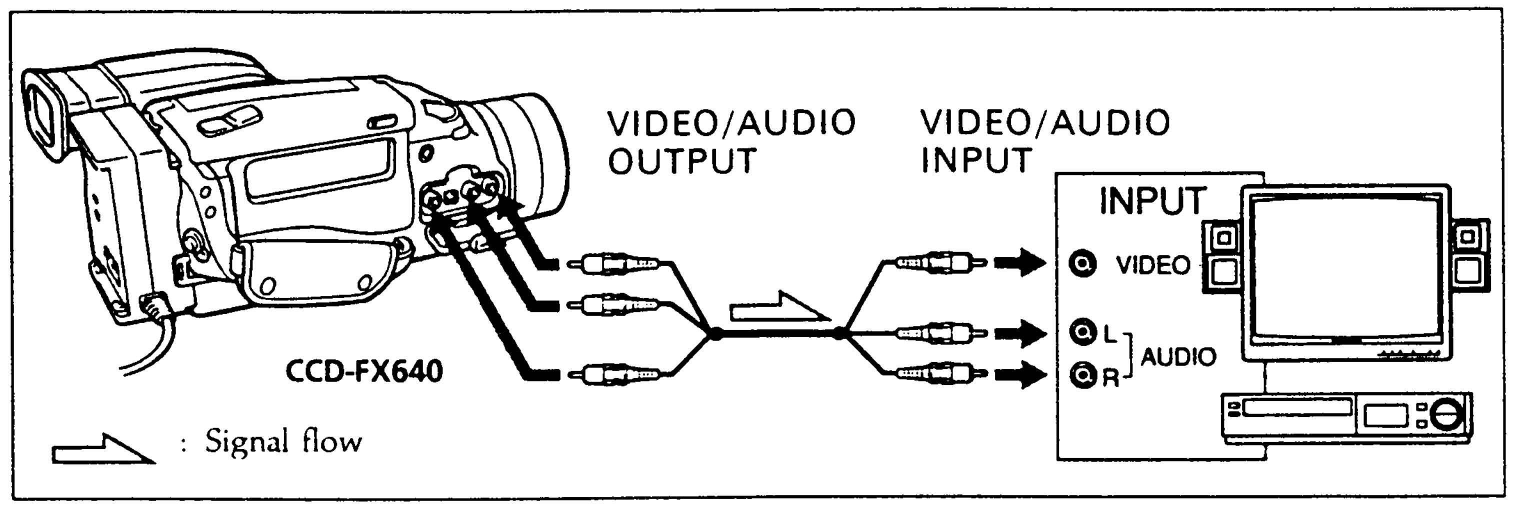
Connections for Playback

You can use the camcorder as a VCR by connecting it to your TV for playback. Connect your camcorder as shown below. It is recommended to use the house current as the power source (p. 19).

Connecting to a TV or VCR with Video/Audio Input Jack

For the Stereo Model (CCD-FX640 only)

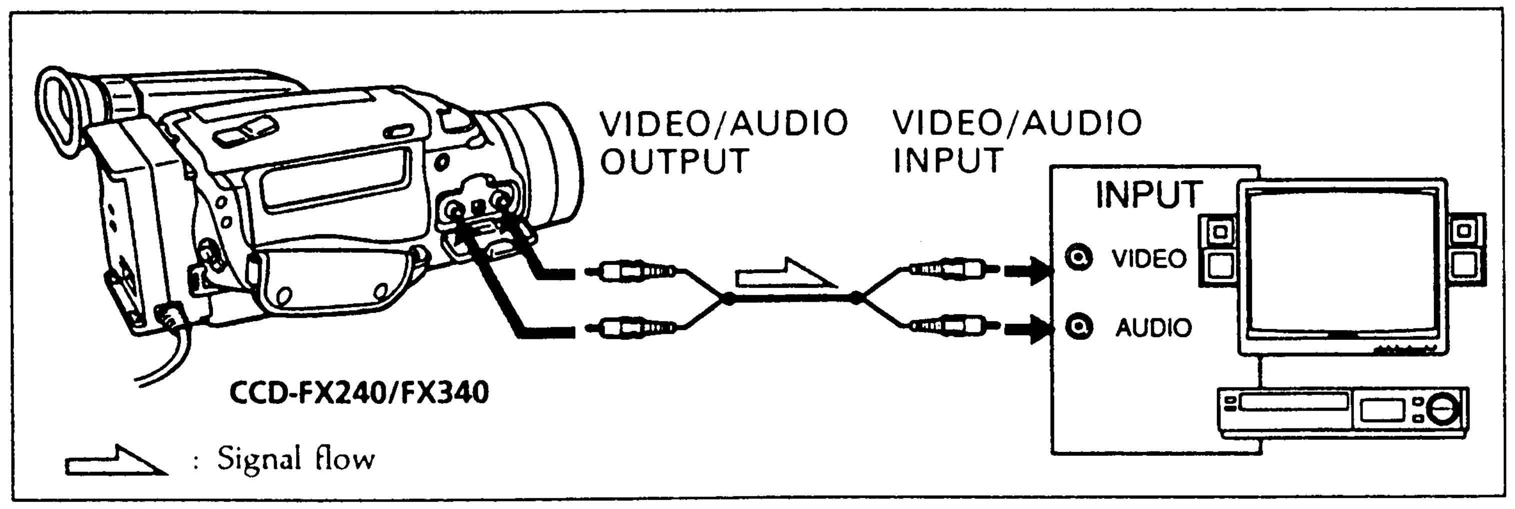
Connect the camcorder to your TV or VCR by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR. When connecting the camcorder to VCR set the input selector on the VCR to LINE.


VIDEO/AUDIO OUTPUT
VIDEO/AUDIO INPUT
INPUT
VIDEO
L
R
AUDIO
CCD-FX640
: Signal flow

If your TV or VCR is monaural type, connect only the white plug for audio on both the camcorder and the TV or the VCR. With this connection, the sound is monaural.

For Monaural Models (CCD-FX240/FX340)

Connect the camcorder to your TV by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR. When connecting the camcorder to VCR, set the input selector on the VCR to LINE.


VIDEO/AUDIO OUTPUT
VIDEO/AUDIO INPUT
INPUT
VIDEO
AUDIO
CCD-FX240/FX340
: Signal flow

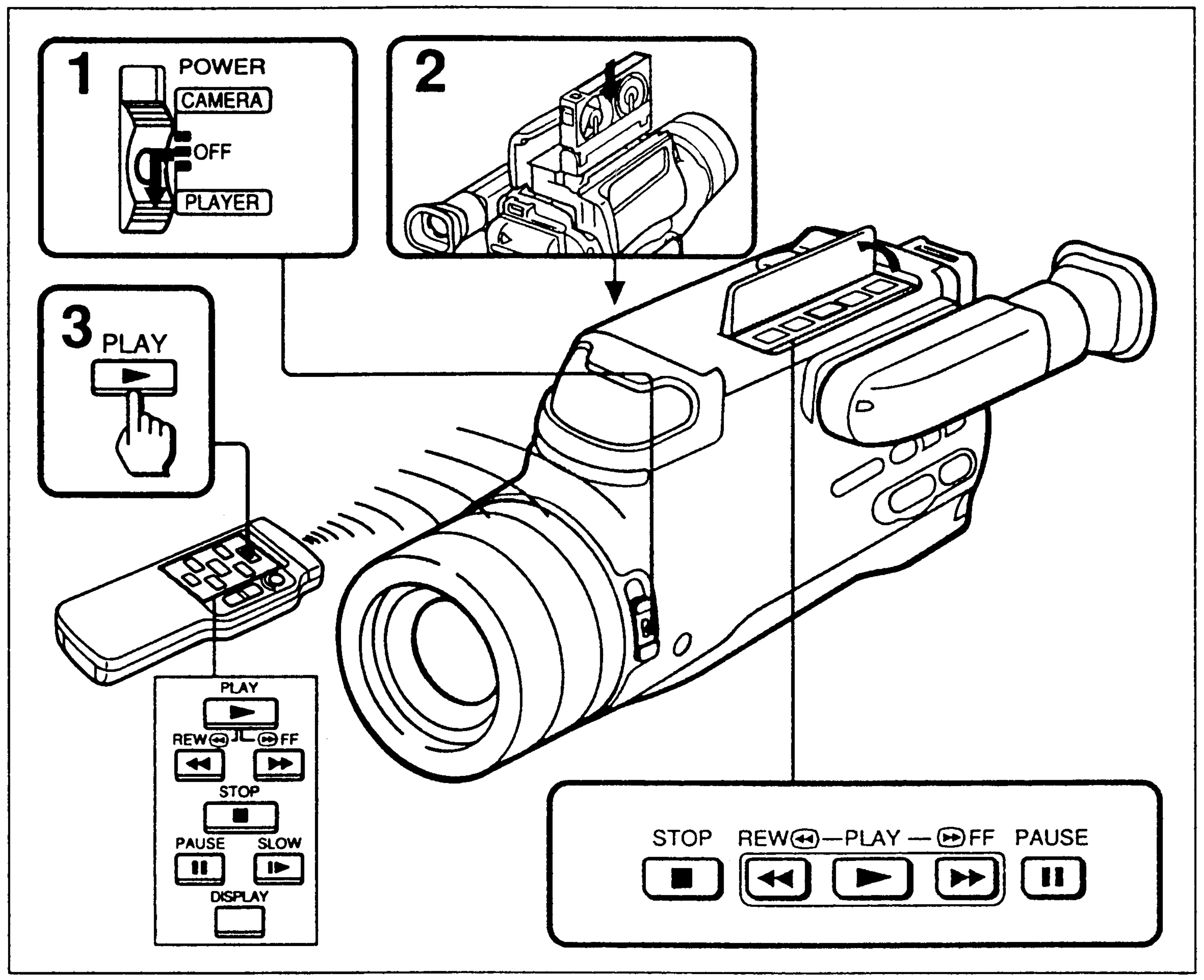
To connect a TV or a VCR without audio/video input jacks

Use the RFU-95UC RFU adaptor (not supplied).

Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor the picture on a TV screen, after connecting the camcorder to a TV or VCR (p. 16). You can use the supplied Remote Commander to control playback.

(1) While pressing the small green button on the POWER switch, slide it to PLAYER.
You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).
(2) Insert the recorded tape with the window facing out.
(3) Press ►. Playback starts.


1
POWER
CAMERA
OFF
PLAYER
2
3 PLAY
PLAY
REW
FF
STOP
PAUSE
SLOW
DISPLAY
STOP
REW—PLAY—FF
PAUSE

To stop playback, press ■ .
To rewind the tape, press ◄◄ .
To advance the tape rapidly, press ►► .

Playing Back a Tape

To view a still picture (Playback pause)
Press ‖ during playback. To resume playback, press ‖ or ►.

To locate a scene (Picture search)
Keep pressing ◄◄ or ►► during playback. To resume normal playback, release the button.

To monitor the high-speed picture while advancing the tape or rewinding (Skip scan)
Keep pressing ◄◄ while rewinding or ►► while advancing the tape. To resume normal playback, press ►.

To view the picture in a sequence of stop-motion images
Press EDITSEARCH in playback pause mode. If you keep pressing EDITSEARCH, you can view the picture play back in the forward (+) or reverse (–) direction.

To view the picture at 1/5 speed (Slow Playback) (only with the Remote Commander)
Press I► on the Remote Commander during playback. To resume normal playback, press ► . If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

Note on playback
- Streaks appear and the sound is muted in the various playback modes.
- When Playback pause mode lasts for 5 minutes, the camcorder automatically enters stop mode.

To display the viewfinder screen indicators on the TV
Press DISPLAY on the Remote Commander. To erase the indicators, press DISPLAY again.

To select the playback sound
— For stereo model (CCD-FX640 only)
Change the "HiFi SOUND" mode setting in the menu system (p. 31)

Advanced Operations

Using Alternative Power Sources

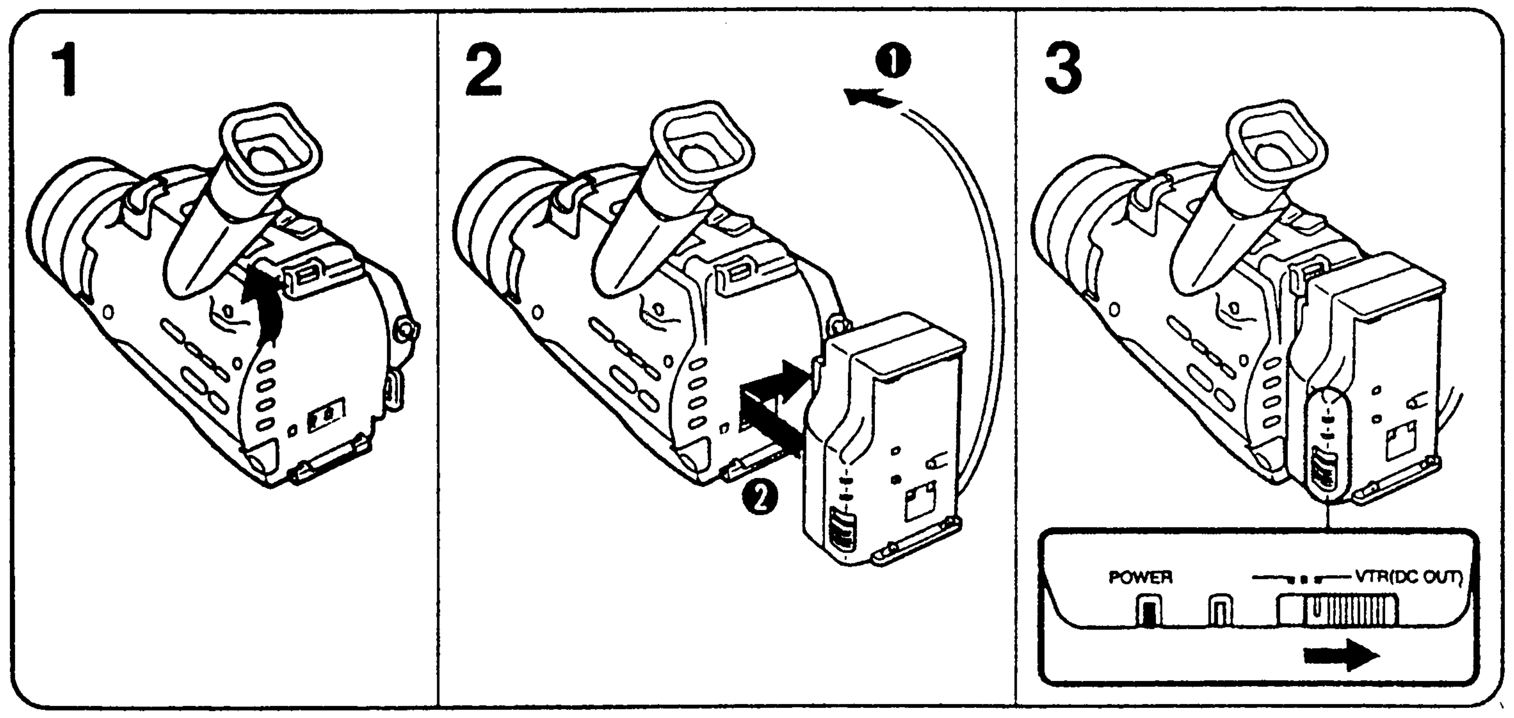
You can choose any of the following power sources for your camcorder: battery pack (p. 6), house current, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC power adaptor AC-V25A/V25B/V25C (supplied), AC-S10, AC-V55
Outdoors	Battery pack	Battery pack NP-55 (supplied), NP-60D, NP-C65, NP-68, NP-77H, NP-80/80D
In the car	12 V or 24 V car battery	DC pack DCP-77

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If this happens, restore the power supply again immediately.

Using House Current

To use the supplied AC-V25A/V25B/V25C AC power adaptor:
(1) Lift up the viewfinder.
(2) Connect the AC power cord to a wall outlet. Connect the bottom of the AC power adaptor to the battery mounting surface of the camcorder.
(3) Set the selector to VTR (DC OUT).



Notes on the POWER lamp
- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to VTR (DC OUT) again.

To remove the adaptor
The adaptor is removed in the same way as the battery pack (p. 8).

Using Alternative Power Sources

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

To remove the DC pack
The DC pack is removed in the same way as the battery pack (p. 8).

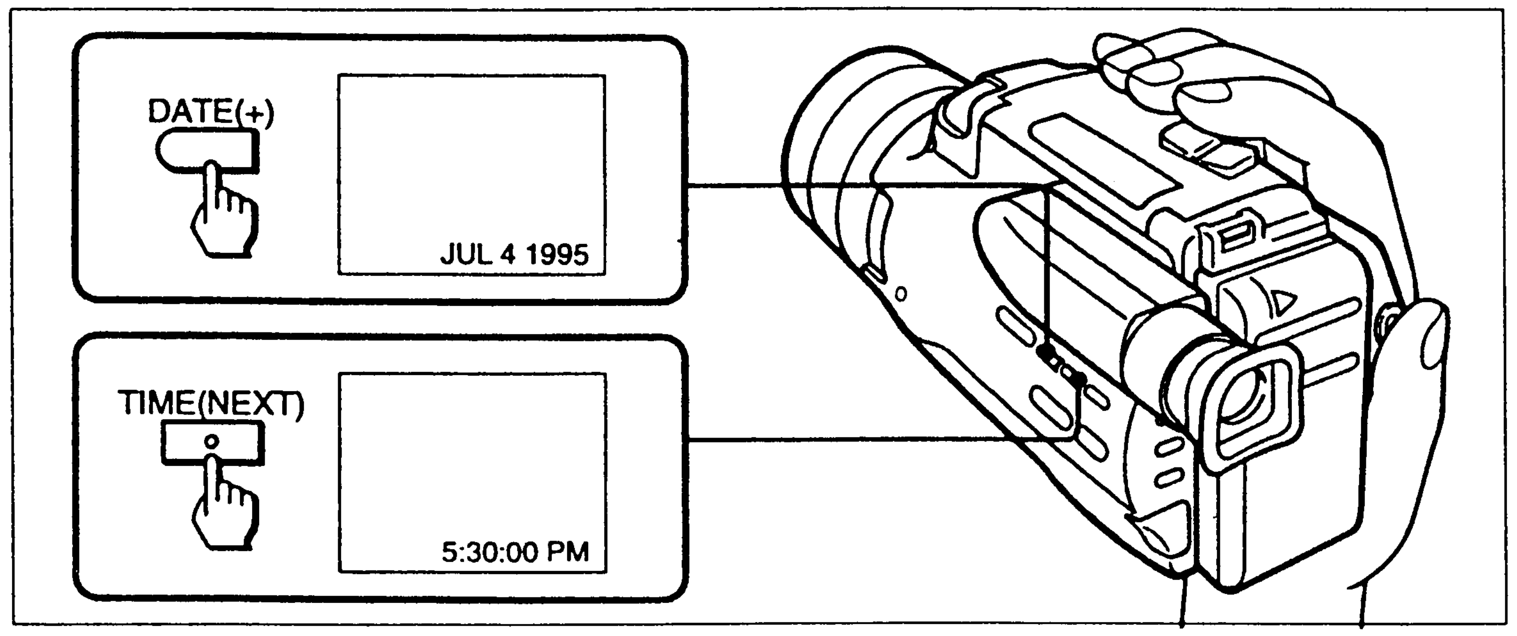
Options for Charging the Battery Pack

- AC-S10 AC power adaptor:
  You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.
- BC-S10 portable battery charger (ideal for travel):
  You can charge a battery pack on 100 — 240 V AC current.

This mark indicates that this product is a genuine product related our 8mm video equipment. When purchasing our 8mm video equipment, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

Recording with the Date or Time

Before you start recording, press DATE (+) or TIME (NEXT). You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date, time or age indicator, no indicator in the viewfinder is recorded.
The clock is set to the East Coast Standard Time at the factory, but you can reset the clock in the menu system (p. 34).



To Stop Recording with the Date or Time

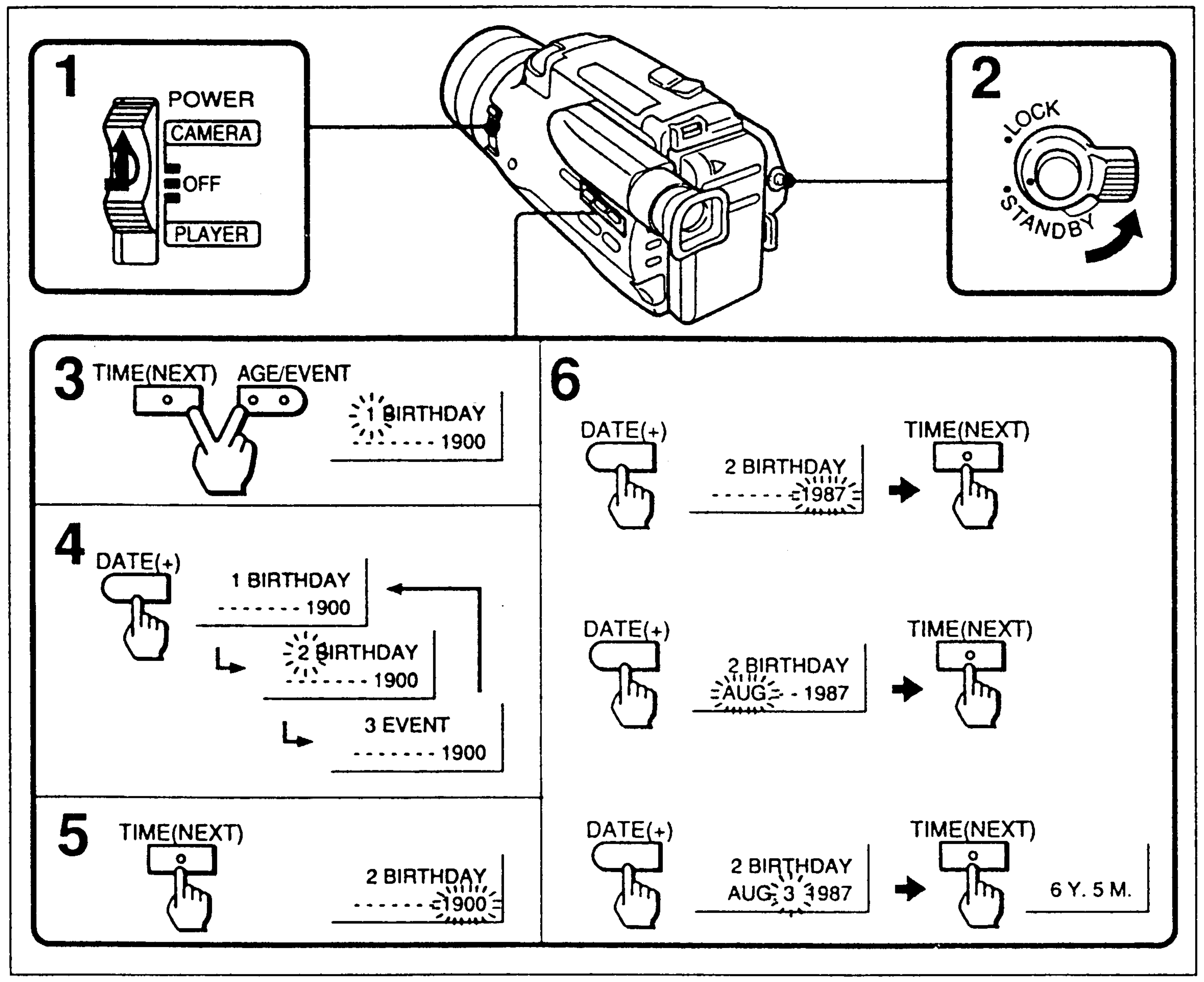
Press DATE (+) or TIME (NEXT) again. The date or time indicator disappears. The recording continues.

Recording with the Age

Storing a Birth Date in Your Camcorder

By presetting your child's birth date in your camcorder, you can record your child's age in years and months on your tape. Once you enter the birth date of your child, the camcorder's clock will automatically update the age of your child. You can preset up to three birth dates or events in the camcorder's memory.
Before storing a birth date, make sure a power source and the lithium battery are installed, and the date setting is correct. The following procedure stores "Aug. 3 1987" in memory 2 as an example.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA.
(2) Turn STANDBY up.
You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).
(3) Press TIME (NEXT) and AGE/EVENT simultaneously for a few seconds until the "1 BIRTHDAY--- --1900" indicator appears in the viewfinder.
(4) Press DATE (+) to select "2 BIRTHDAY."
(5) Press TIME (NEXT). The "1900" indicator flashes.
(6) Enter the birth date by adjusting the flashing indicators of the year, month and day by pressing DATE (+) and TIME (NEXT). Note that when you keep DATE (+) pressed, the digits advance faster.



Note on the birth or event dates indicators
Each time you press DATE (+), the display in the viewfinder changes from "1 BIRTHDAY" to "2 BIRTHDAY," "3 EVENT" and comes back to "1 BIRTHDAY."

Erasing the Age Indicator in the Viewfinder

Press AGE/EVENT repeatedly until no indicator appears.

If You Missed the Correct Number with DATE (+)

Keep pressing DATE (+). The indicator changes as follows:

Year: "1900" → "1901" ---→ Current year
└-- Current year minus 99 ←┘

Month: "JAN." → "FEB." ---→ "DEC." → "---"

Day: "1" → "2" ---→ "31"

To Correct the Setting

Repeat steps from 3 to 6.

To Preset the Year before 1900

(1) After step 5, keep pressing DATE (+) until the current year is displayed.
(2) Press DATE (+) again. The year goes back 99 years.
(3) Go to step 6.

When in 2000

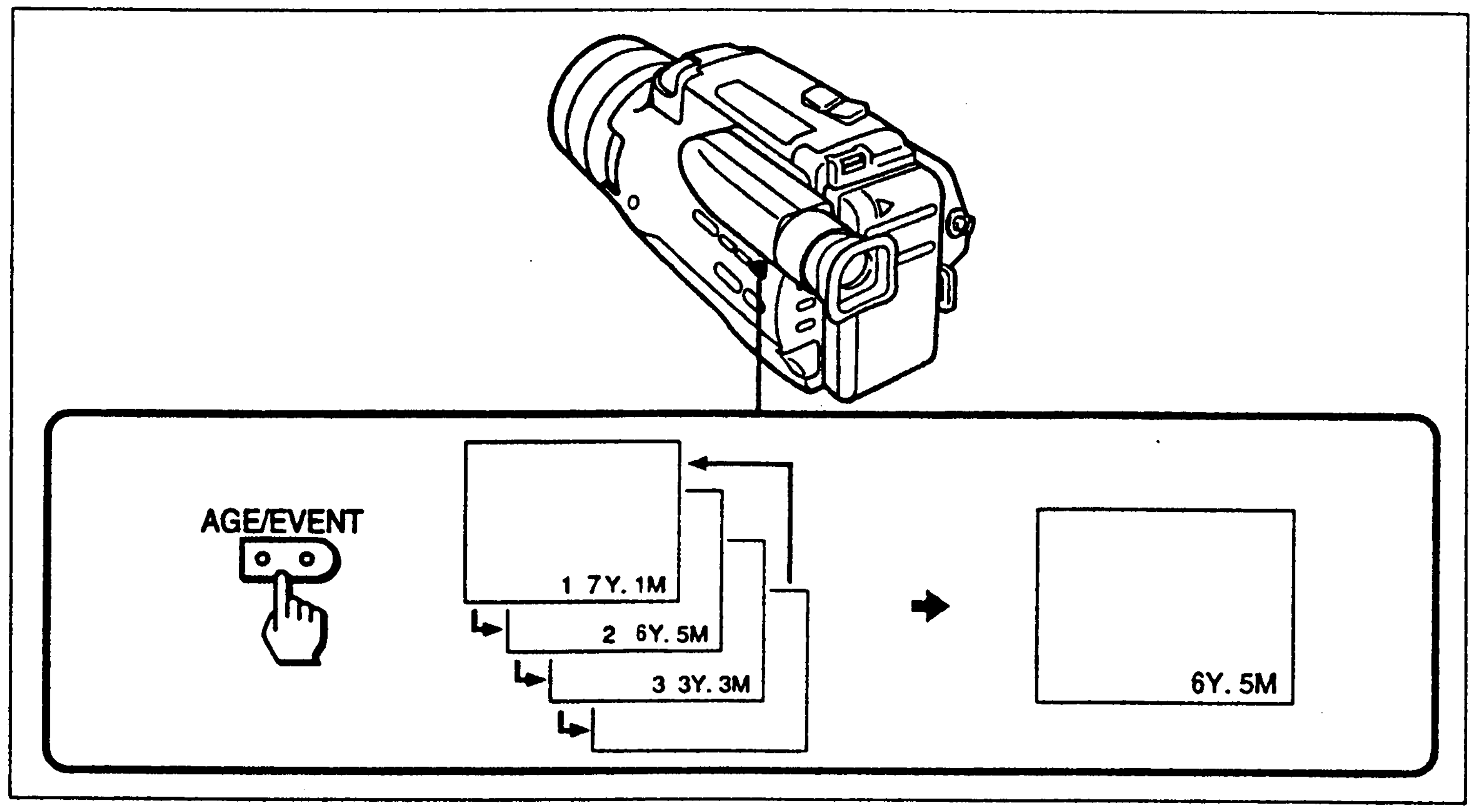
"--- -- 1901" is displayed in step 3. After that, it advances every year as "1902, 1903 ......"

To Cancel the Stored Birth Date

(1) Press AGE/EVENT and TIME (NEXT) simultaneously to make 1 BIRTHDAY appear in the viewfinder. Press DATE (+) to select a birth date to cancel.
(2) Press TIME (NEXT) twice. The month indicator flashes.
(3) Press DATE (+) repeatedly until "--- --" appears.
(4) Press TIME (NEXT). The selected birth date is canceled from the memory and is not displayed when you press AGE/EVENT.

Recording with the Age

Make sure the age is set. While recording, press AGE/EVENT to select memory 1, 2 or 3. You can record the time elapsed since the date set, for example, your child's birthday. Except for the age, date or time (p. 20) indicator, no indicator in the viewfinder is recorded.



Note on the age indicator

Each time you press AGE/EVENT, the indicator changes from 1 "The first age" to 2 "The second age," 3 "The third age" and back to no indicator. Items for which no setting has been made will be skipped. The 1, 2 or 3 indicator disappears after one second.

To Stop Recording with the Age

Press AGE/EVENT repeatedly until the age indicator disappears.

To Correct the Age Settings while Recording

Press AGE/EVENT repeatedly until the desired age appears. The recording starts after the 1, 2 or 3 indicator disappears.

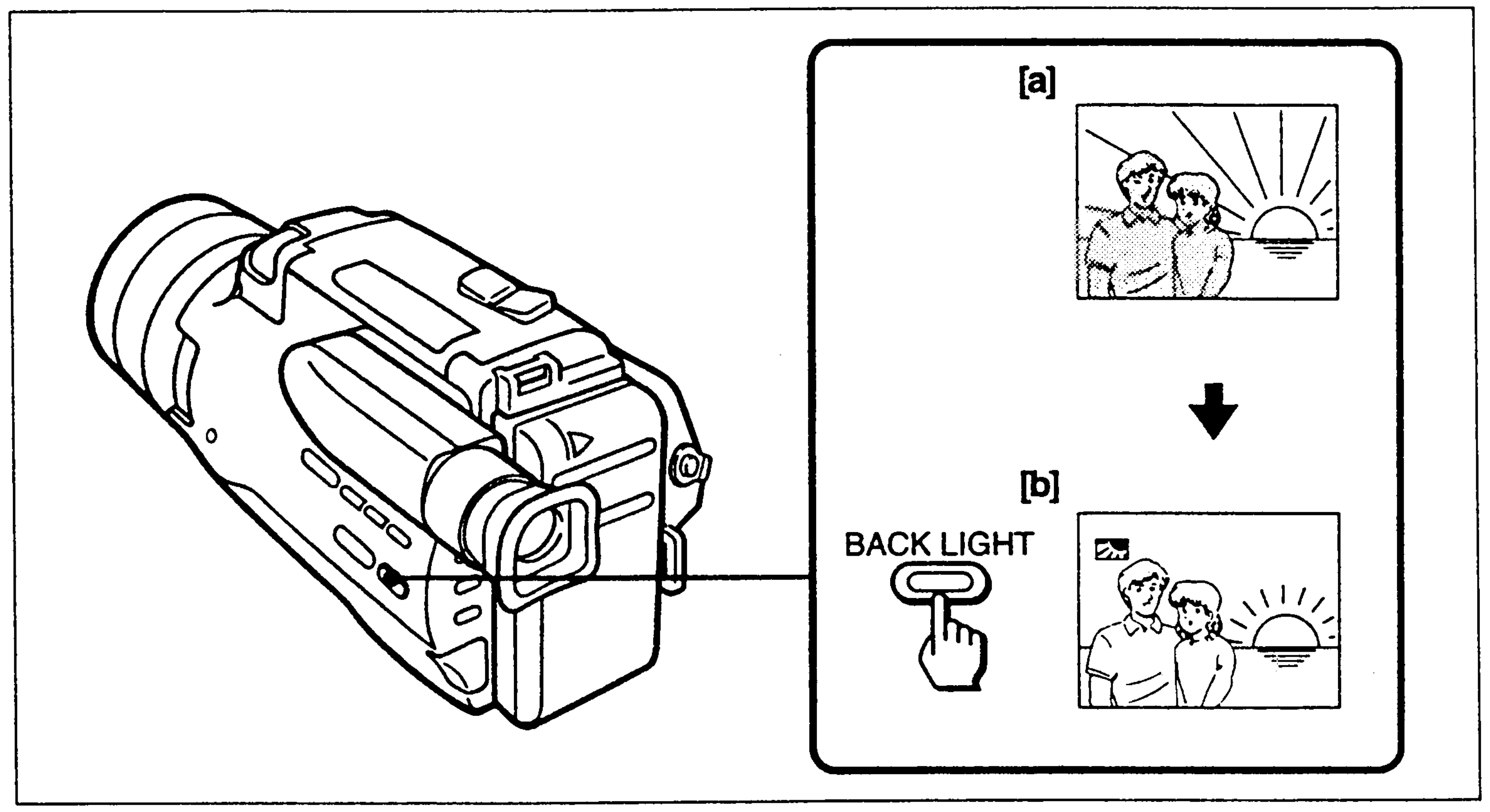
When the camcorder is connected to a TV

The age indicator appears on the TV screen after the 1, 2 or 3 indicator disappears in the viewfinder screen.

Shooting with Backlighting

When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT function.

Press BACK LIGHT. The ▨ indicator appears in the viewfinder.



[a] Subject is too dark because of backlight.
[b] Subject becomes bright with backlight compensation.

After shooting

Be sure to release this adjustment condition by pressing BACK LIGHT again. The ▨ indicator in the viewfinder disappears. Otherwise, the picture will be too bright under normal lighting condition.

This function is also effective under the following conditions:

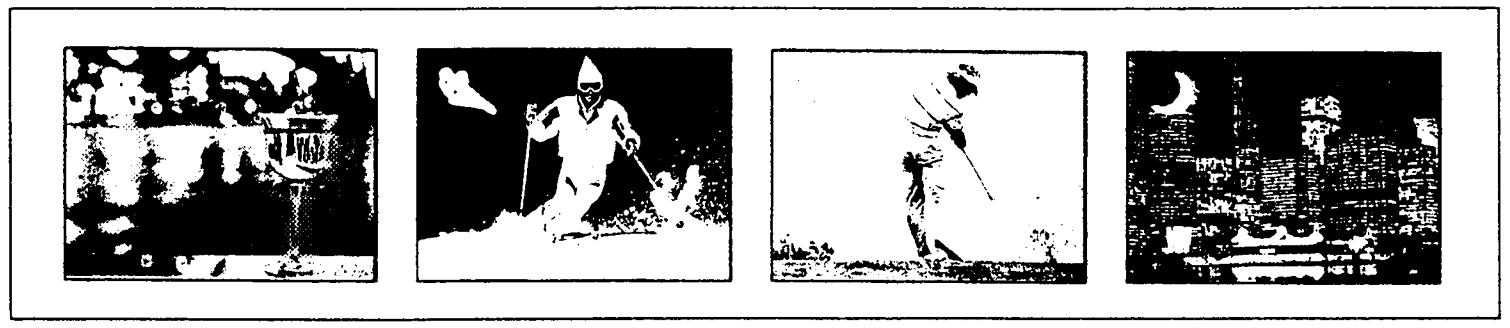
- On snow, e.g. at a ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.

Using the PROGRAM AE Function

You can select from four PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can get a Portrait effect (the subject is in focus and the background is out of focus), capture high-speed action, or record night views.

Selecting the Best Mode

Select one of four modes, referring to the following.



Portrait mode
- A still subject such as a person or a flower
- Zooming in on a subject in the telephoto mode
- A subject behind an obstacle such as a net

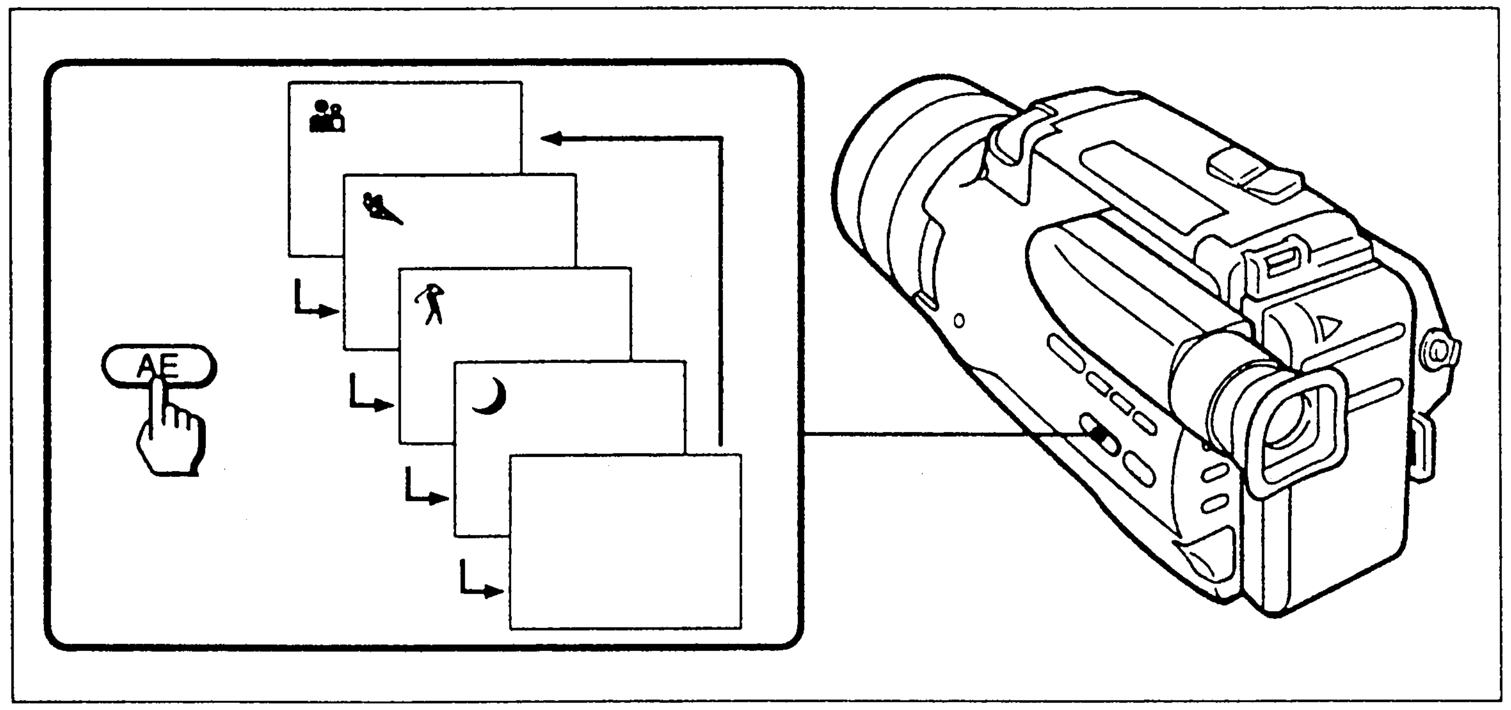
Sports mode
- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape from a moving car

High-speed shutter mode
- A golf swing or a tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in a clear, sharp picture

Twilight mode
- Recording night views, neon signs or fireworks

Using the PROGRAM AE Function

Press PROGRAM AE. The indicator of the selected PROGRAM AE mode appears in the viewfinder.



Note on shutter speed
The shutter speed in each PROGRAM AE mode is as follows:

Portrait mode — between 1/60 to 1/2000
Sports mode — between 1/60 to 1/500
High-speed shutter mode — 1/4000
Twilight mode — 1/60
Normal mode — 1/60

Fade-in and Fade-out

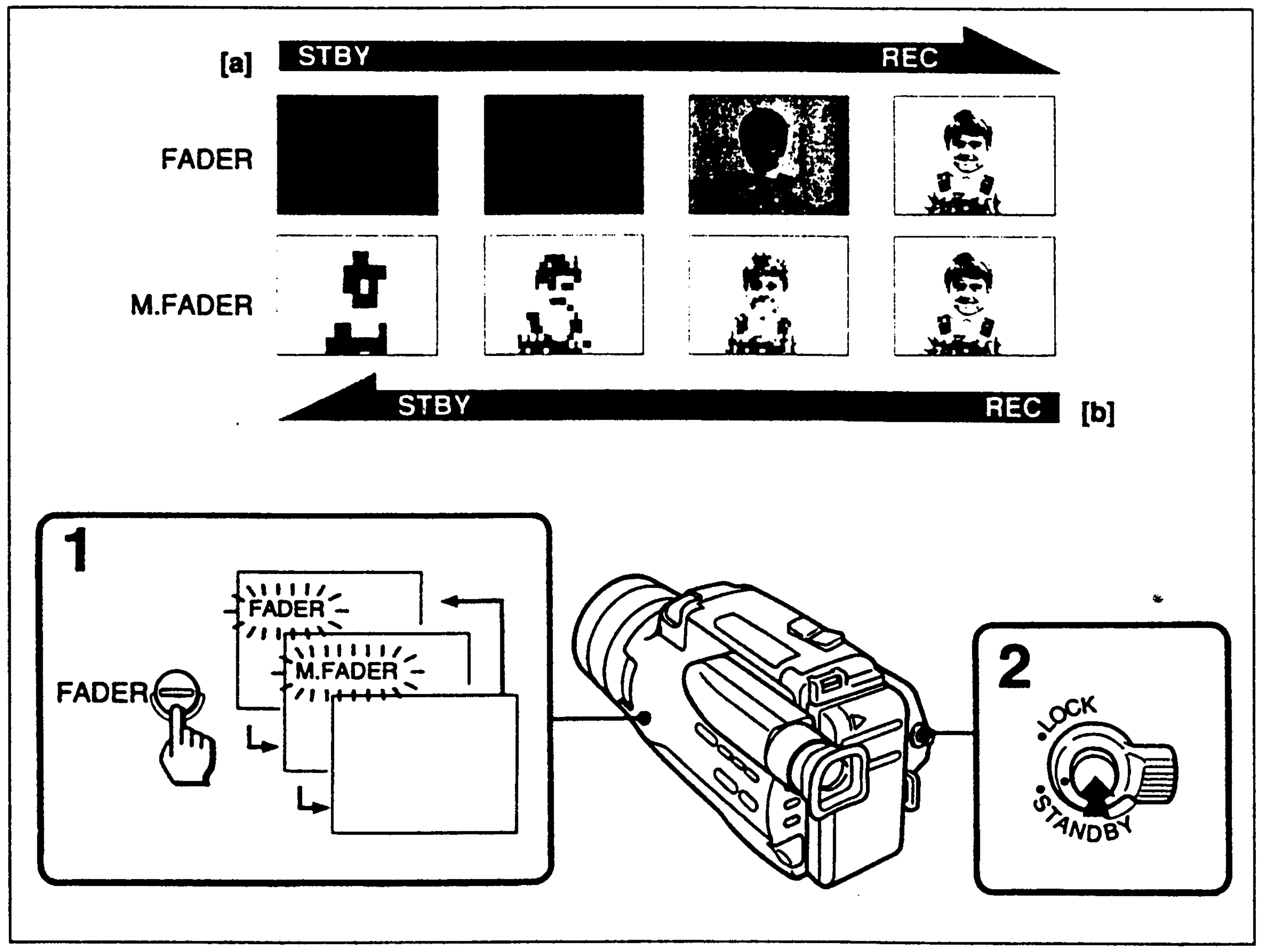
You can fade in or out to give your recording a professional appearance.
When fading in, the picture gradually fades in from black or mosaic while the sound increases. When fading out, the picture gradually fades to black or mosaic while the sound decreases.
You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).

When Fading in [a]

(1) While the camcorder is in Standby mode, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to start recording. The fade indicator stops flashing.

When Fading out [b]

(1) During recording, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to stop recording. The fade indicator stops flashing, and then recording stops.



To Cancel the Fade-in/Fade-out Function

Before pressing START/STOP, press FADER until the fade indicator disappears.

When the date/time or age indicator is displayed
The date/time or age indicator does not fade in nor fade out.

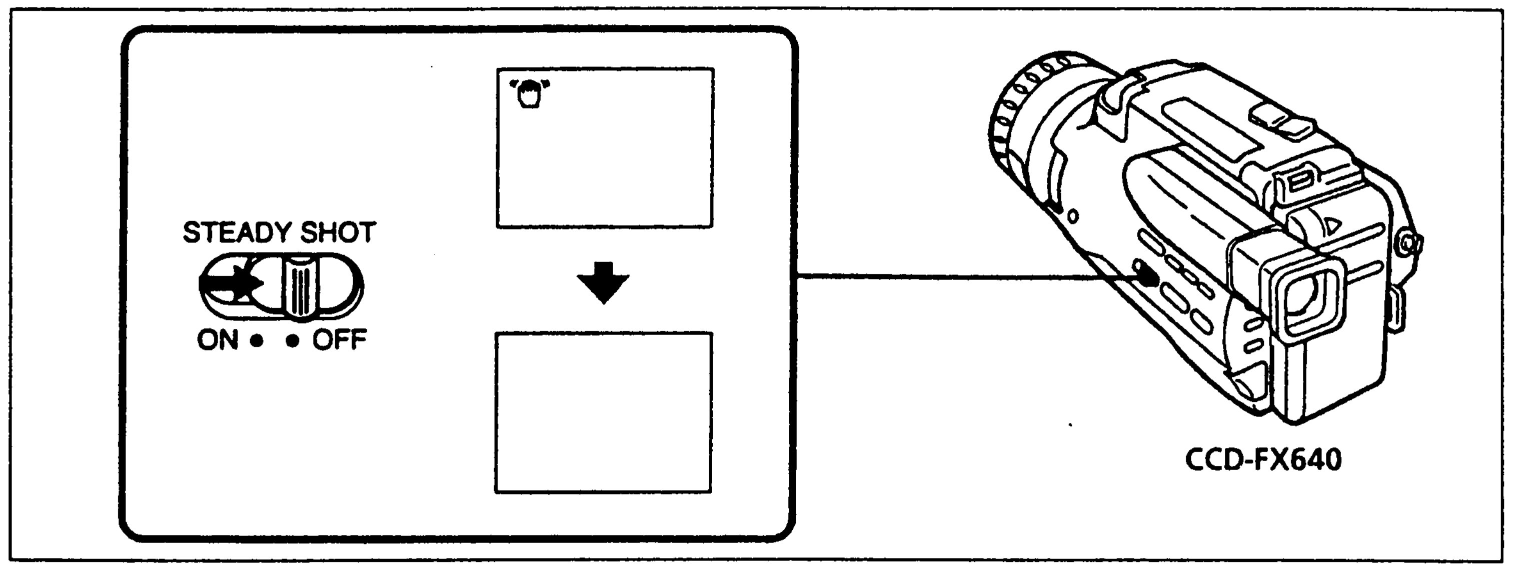
Releasing the STEADY SHOT Function

— For model with the STEADY SHOT switch (CCD-FX640 only)

When you shoot, the ◉ indicator appears in the viewfinder. This indicates that Steady Shot function is working and the camcorder compensates for camera-shake.

You can release the steady shot function when you do not need to use the Steady Shot function. Do not use the steady shot function when shooting a stationary object with a tripod.

Set STEADY SHOT to OFF.



To Activate the Steady Shot Function again

Set STEADY SHOT to ON.

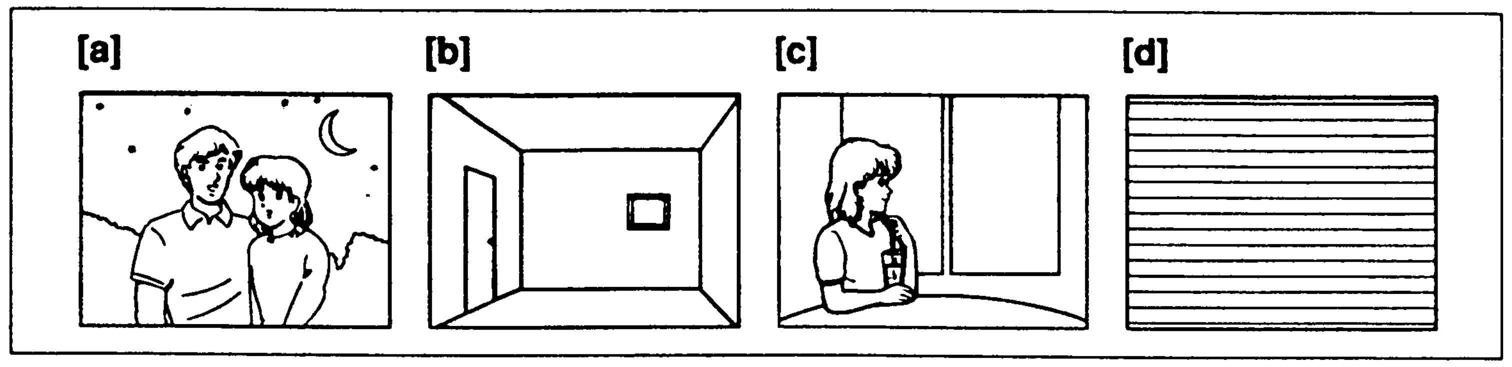
Notes on the Steady Shot Function
- The Steady Shot Function will not correct excessive camera-shake.
- When you switch the STEADY SHOT function on or off, the exposure may fluctuate.

Focusing Manually

— For models with the FOCUS switch (CCD-FX640 only)

When to Use Manual Focus

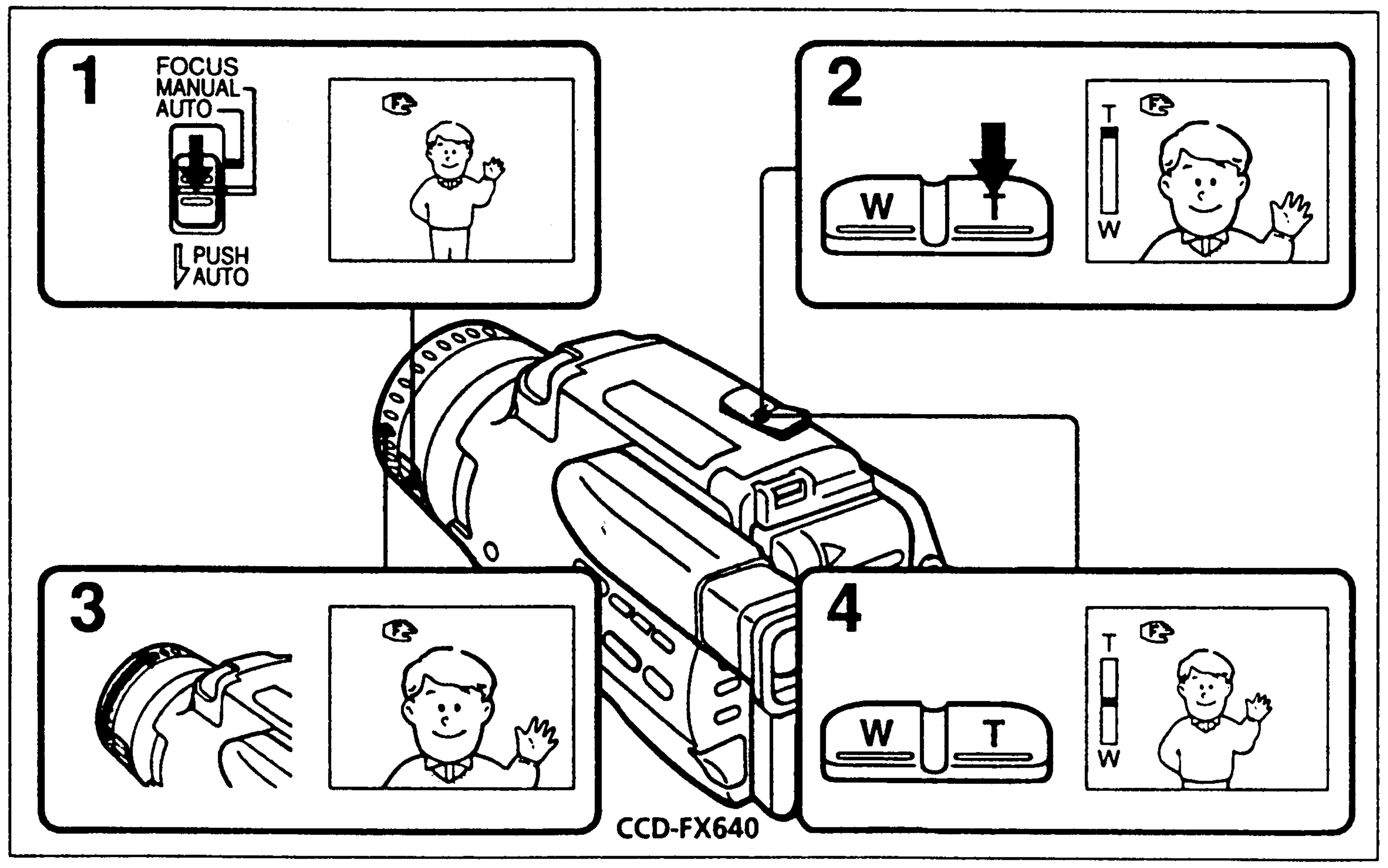
In the following cases you should obtain better results by adjusting the focus manually.



- Insufficient light **[a]**
- Subjects with little contrast — walls, sky, etc. **[b]**
- Too much brightness behind the subject **[c]**
- Horizontal stripes **[d]**
- Subject through frosted glass
- Subjects beyond nets, etc.
- Bright subject or subject reflecting light
- Shooting a stationary subject when using a tripod

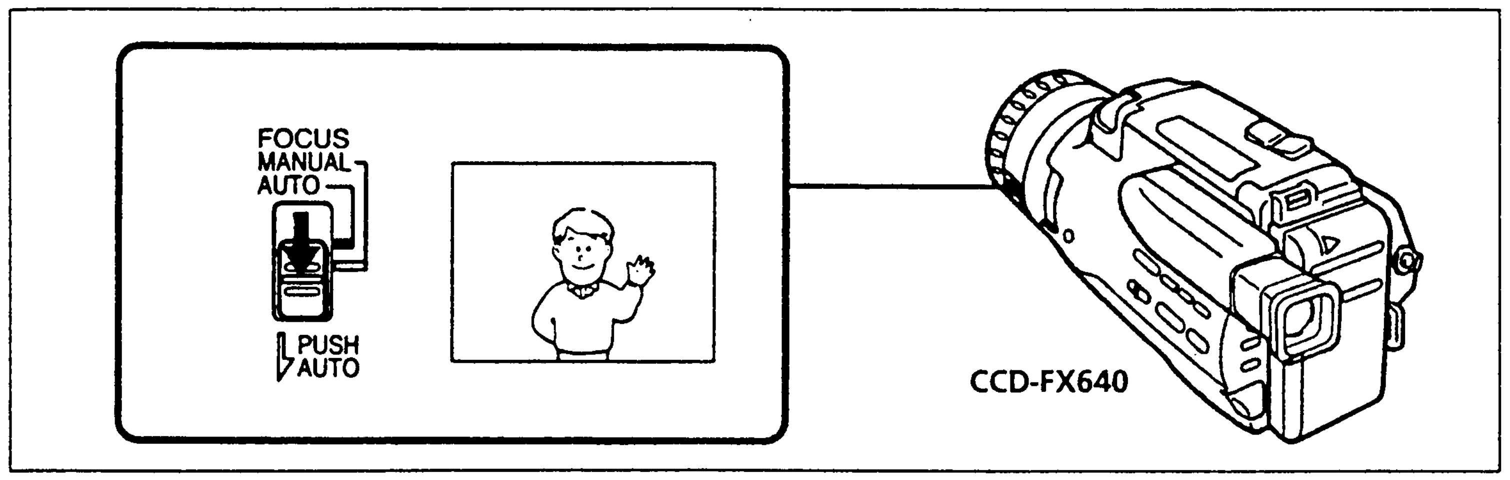
Focusing Manually

When focusing manually, first focus in telephoto before recording, and then reset the shot length.
(1) Set FOCUS to MANUAL. The Ⓕ indicator appears in the viewfinder.
(2) Keep pressing the "T" (telephoto) side of the power zoom button until the zooming stops.
(3) Turn the focus ring to achieve a sharp focus.
(4) Set the desired shot length using the power zoom button.



To Shoot with Autofocus Momentarily

When you want to switch to autofocus momentarily while recording in manual focus mode, push FOCUS down to PUSH AUTO. Autofocus functions while FOCUS is held down. When it is released, manual focus mode will be resumed.



To Return to Autofocus Mode

Set FOCUS to AUTO. The Ⓕ indicator in the viewfinder disappears.

Shooting in relatively dark places

Shoot at wide-angle after focusing in the telephoto position.

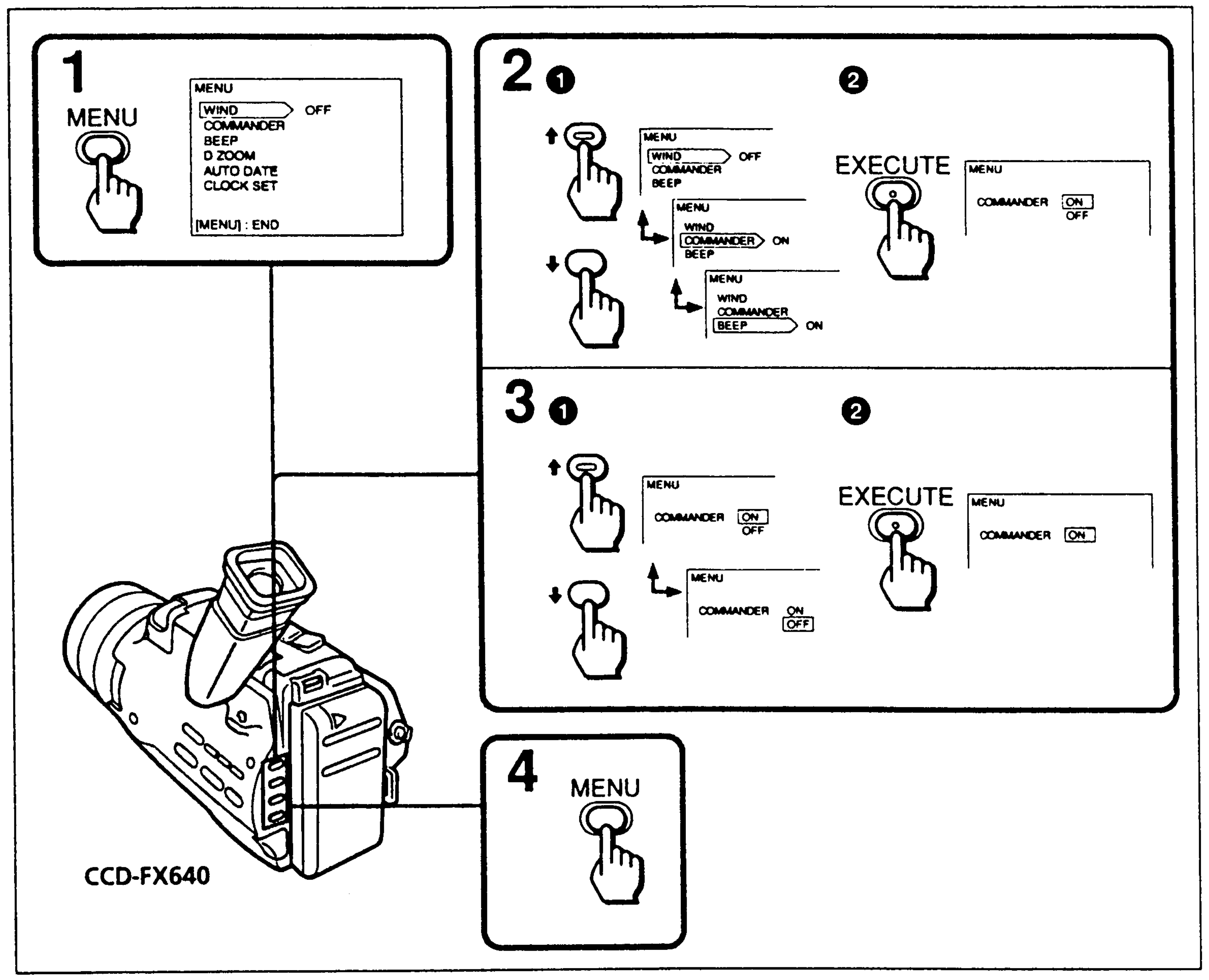
Note on the focus ring

The focus ring does not have a stop position.

Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions of the camcorder.

(1) Press MENU to display the menu in the viewfinder.
(2) Press ↑ or ↓ to select the desired item, then press EXECUTE.
(3) Press ↑ or ↓ to set the desired mode, then press EXECUTE. If you want to change the other modes, repeat steps 2 and 3.
(4) Press MENU to erase the menu display.


1
MENU
MENU
WIND OFF
COMMANDER
BEEP
D ZOOM
AUTO DATE
CLOCK SET
[MENU] : END
2 ❶
MENU
WIND OFF
COMMANDER
BEEP
MENU
WIND
COMMANDER ON
BEEP
MENU
WIND
COMMANDER
BEEP ON
❷
EXECUTE
MENU
COMMANDER ON OFF
3 ❶
MENU
COMMANDER ON OFF
MENU
COMMANDER ON OFF
❷
EXECUTE
MENU
COMMANDER ON
4
MENU
CCD-FX640

Note on BACK UP

When the BACK UP indicator appears on the menu display, the settings are retained even when the battery is removed, as long as the lithium battery is in place.

Selecting the Mode Setting of Each Item

Items for both PLAYER and CAMERA Mode

COMMANDER <ON/OFF>

- Select ON when using the supplied Remote Commander for the camcorder.
- Select OFF when not using the Remote Commander.

BEEP <ON/OFF> (CCD-FX640 only)

- Select ON to turn the beep sound on.
- Select OFF to turn the beep sound off.

Items for CAMERA Mode only

WIND <ON/OFF>

— For stereo model (**CCD-FX640** only)

- Select ON when recording in a strong wind. The ⊏ indicator appears in the viewfinder and noise from the wind will be reduced.
- Normally select OFF.

D ZOOM ON/OFF (CCD-FX640 only)

- Select ON to activate digital zooming (24 x).
- Select OFF to not use the digital zoom.
  The camcorder goes back to 12 x zoom.

AUTO DATE <ON/OFF>

- Select ON to record the date for 10 seconds after recording has started.
- Select OFF to not record the date (AUTO DATE feature p. 12).

CLOCK SET

- Select this item to reset the date or time.

Items for PLAYER Mode only

EDIT <ON/OFF>

- Select ON to minimize picture deterioration when editing.
- Normally select OFF.

HiFi SOUND <STEREO/1/2>

— For stereo model (**CCD-FX640** only)

- Normally select STEREO.
- Select 1 or 2 to play back a dual sound track tape.

Editing onto Another Tape

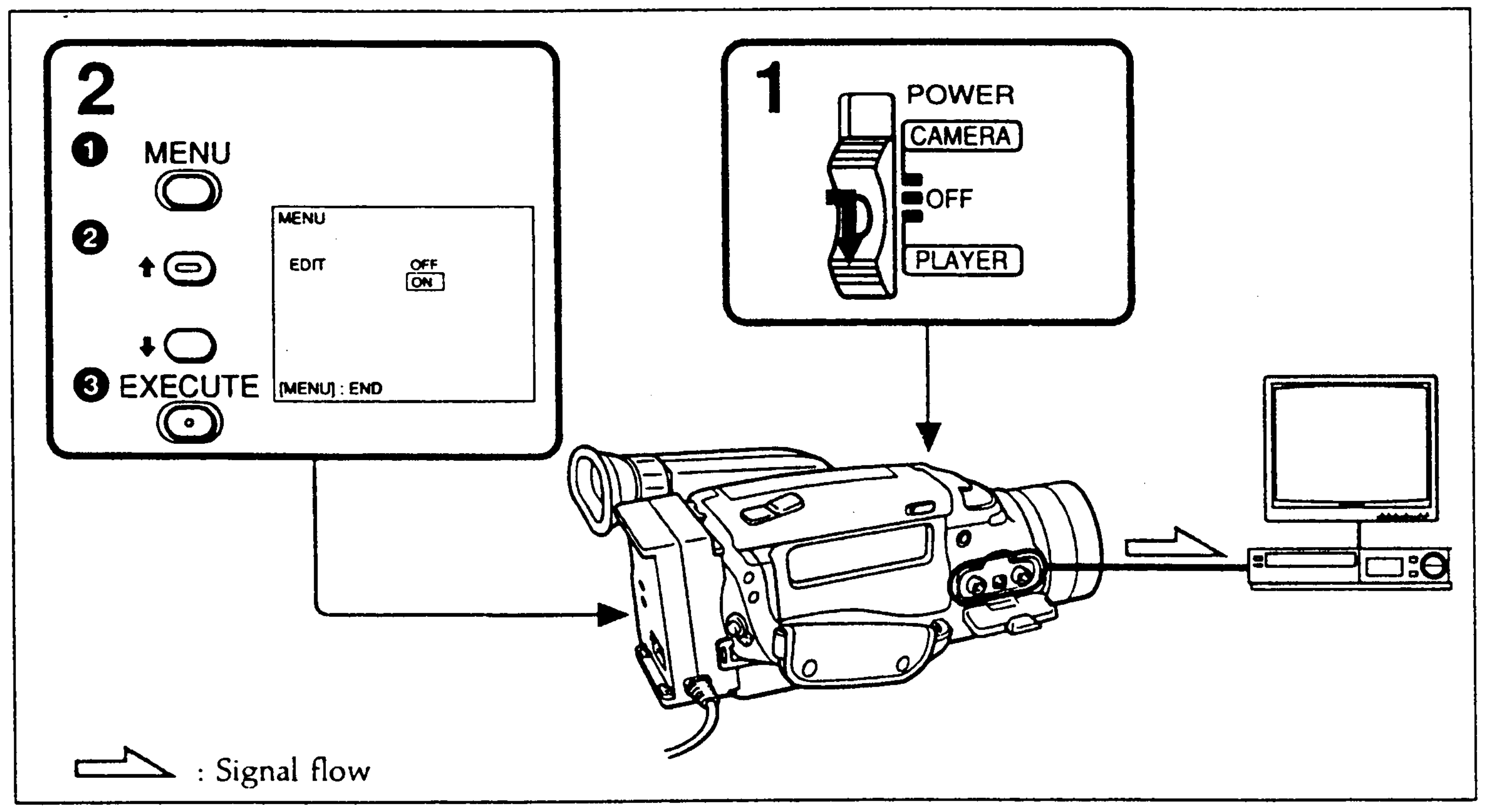
You can create your own video program by editing with any other 8 mm, Hi8, VHS, S-VHS, VHSC, S-VHSC, Betamax or ED Betamax VCR that has audio/video inputs.

Before Editing

Connect the camcorder to the VCR using the supplied A/V connecting cable (p. 16).
Set the input selector on the VCR to LINE, if available.

(1) Set the POWER switch to PLAYER.
You can hear the BEEP sound to confirm your operation (**CCD-FX640** only).

(2) Set EDIT to ON in the menu system (p. 31).



Starting Editing

(1) Insert a blank tape (or a tape you want to record over) into the VCR, insert your recorded tape into the camcorder.

(2) Play back the recorded tape on the camcorder until you locate the point where you want to start editing, then set the camcorder in the playback pause mode.

(3) On the VCR, locate the recording start point and set the VCR in the recording pause mode.

(4) Press II on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes

Repeat steps 2 to 4.

To Stop Editing

Press ■ on both the camcorder and the VCR.

Use of the EDITSEARCH button

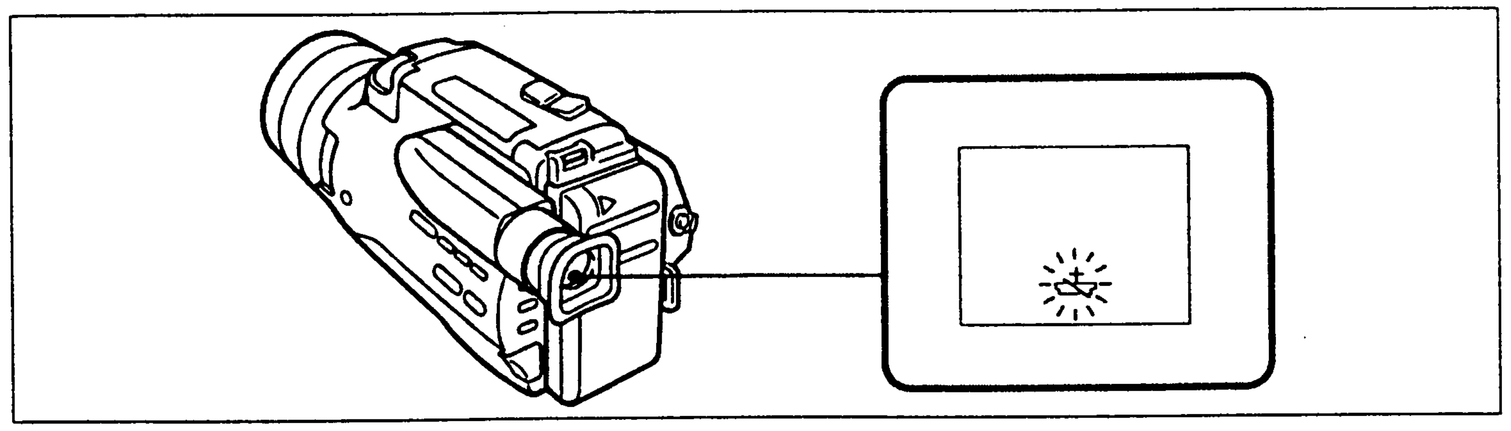
You can play back the tape in normal/reverse direction by holding down EDITSEARCH during playback pause mode. You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Note on the DISPLAY function

If you have displayed the viewfinder screen indicators on the TV, erase the indicators by pressing DISPLAY on the Remote Commander so that they will not be superimposed on the edited tape.

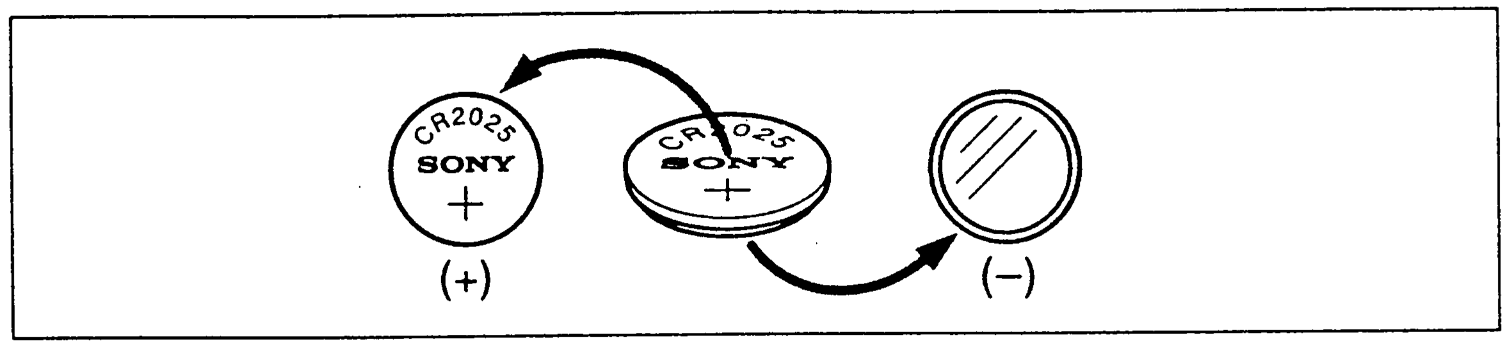
Changing the Lithium Battery

Your camcorder is supplied with a lithium battery installed. The lithium battery for the camcorder lasts for about 1 year under normal operation. When the battery becomes weak or dead, the indicator flashes in the viewfinder for about 5 seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**



Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (–) side as illustrated. Be sure to insert the lithium battery with the positive side facing out.



WARNING

The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Caution

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

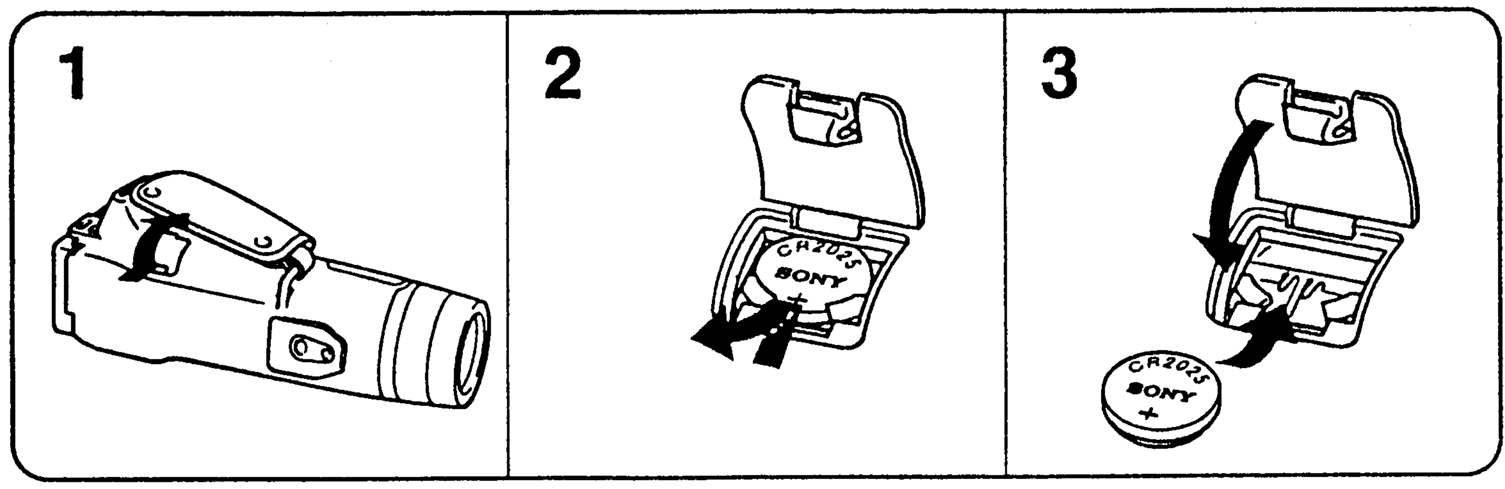
Changing the Lithium Battery

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time, age and other BACK UP items in the menu system.

(1) Open the lid of lithium battery compartment under the grip strap of the camcorder.

(2) Push the battery down once and pull it out from the holder.

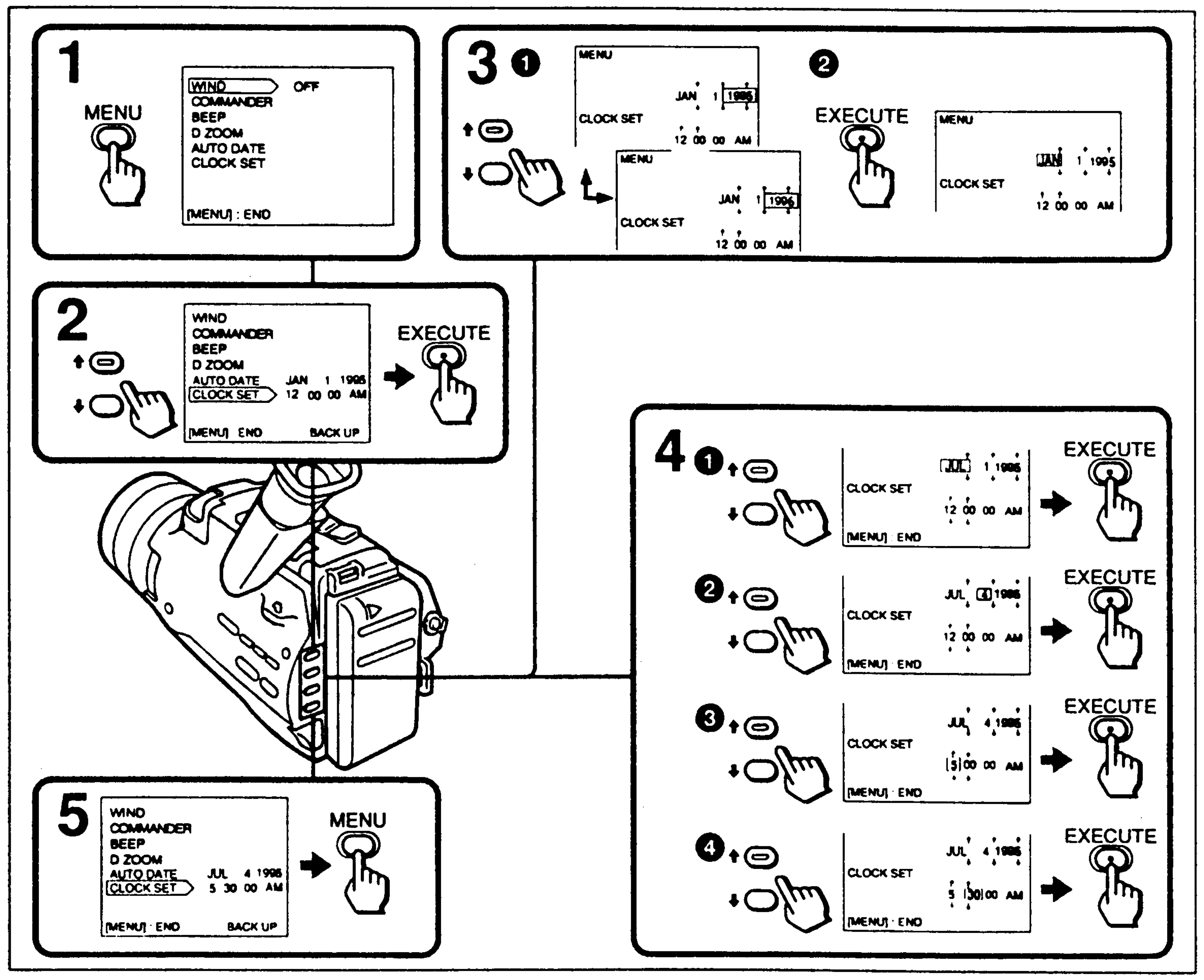
(3) Install the lithium battery with the positive (+) side facing out. Close the lid.



Resetting the Date or Time

You can reset the date or time in the menu system.

(1) Press MENU to display the menu in the viewfinder.
(2) Select CLOCK SET, then press EXECUTE.
(3) Press ⬆ or ⬇ to adjust the year, and then press EXECUTE.
(4) Press ⬆ or ⬇ to adjust the month, day, hour and minutes, and then press EXECUTE. Note that when you keep ⬆ or ⬇ pressed, the indications in the menu display advance faster.
(5) Press MENU to erase the menu display.



To Check the Preset Date and Time

Press DATE (+) to display the date indicator in the viewfinder.
Press TIME (NEXT) to display the time indicator. When you press the same button again, the indicator goes off.

Note on the setting of the year

When you set the year, each time you press DATE (+) the digits change as follows.

1995 → 1996 → - - - - → 2024
↑______________________________|

Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle.
12:00 AM stands for midnight.
12:00 PM stands for noon.

Playback Modes

The playback mode (SP or LP) is selected automatically according to the format in which the tape has been recorded. The quality of the recorded picture in LP mode, however, will not be as good as that in SP mode.

Note on AFM Hi-Fi stereo — For stereo model (CCD-FX640 only)

When you play back a tape, the sound will be in monaural if :

- You record the tape using this camcorder, then play it back on an AFM Hi-Fi monaural video recorder/player.
- You record the tape on an AFM Hi-Fi monaural video record, then play it back on this camcorder.

LP (long play) mode

When you play back a tape recorded in LP mode, the LP indicator lights up in the viewfinder. This camcorder cannot record a tape in LP mode.

Foreign 8 mm video

You cannot play back software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to play back foreign pre-recorded software. Refer to page 41 to check the TV color system of foreign countries.

Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment

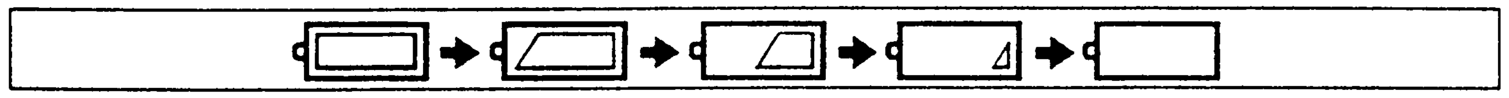
Battery efficiency is decreased and the battery will be used up more quickly if you are recording in a cold environment.

To Save Battery Power

Turn STANDBY on the camcorder down when not recording to save battery power (p. 36) **[a]**.
A smooth transition between scenes can be made even if recording is stopped and started again. While you are positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator in the viewfinder decreases gradually as battery power is used up.



When the remaining battery indicator reaches the lowest point, the ◁▭ indicator appears and starts flashing in the viewfinder (p. 36) **[b]**.
When the ◁▭ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain a smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with its own indicator (not supplied). The indicator on the battery pack is more accurate.

Notes on the Rechargeable Battery Pack

The Battery Pack Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Pack Care

- Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.

Tips for Using the Battery Pack

- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery pack right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery pack. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself) **[c]**.

The Life of the Battery Pack

If the battery indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperature require a longer charging time.

Sony Batteries are Recommended

Use of non-Sony batteries may damage your Handycam camcorder.

Notes on Charging

A Brand-new Battery Pack

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the ▭ indicator appears in the viewfinder, you should remove the tape, slide the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the battery indicator flashes rapidly.
- When you use the AC-S10 power adaptor or the BC-S10 portable battery charger, you can use the discharging function.
- **Charging a usable battery pack causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery pack again.**

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

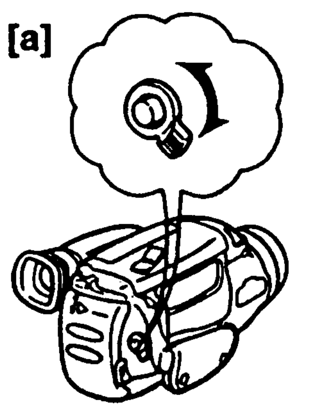
Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, repeatedly install and remove the battery pack. This improves the contact condition. Also, wipe the + and − terminals with a soft cloth or paper.

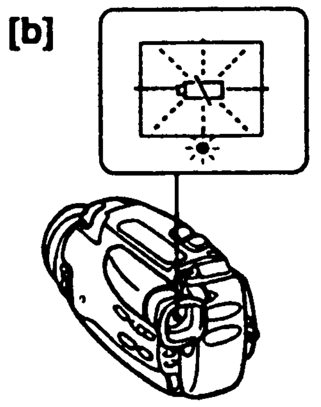
Be Sure to Observe the Following

- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. When carrying the battery pack, attach the terminal cover [d].**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

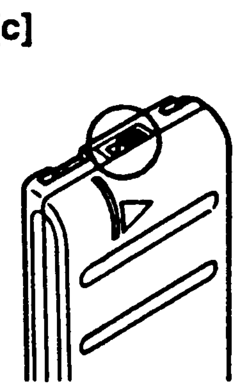
[a]



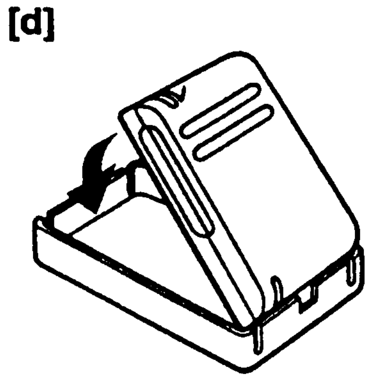
[b]



[c]



[d]



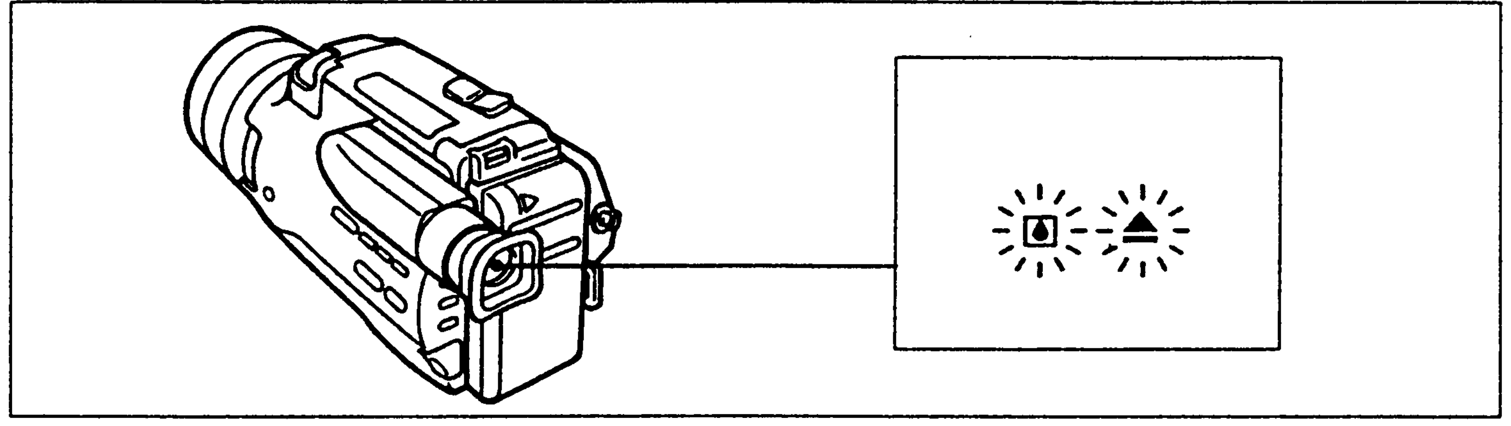
Maintenance Information and Precautions

Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the Camcorder

When the ▣ and ▲ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour. The camcorder can be used again if the ▣ indicator does not appear when the power is turned on again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert the cassette and press a tape transport button (►PLAY, etc.), the ▲ indicator in the viewfinder flashes.
In this case, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour. The camcorder can be used again if the ▲ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

On the Lens

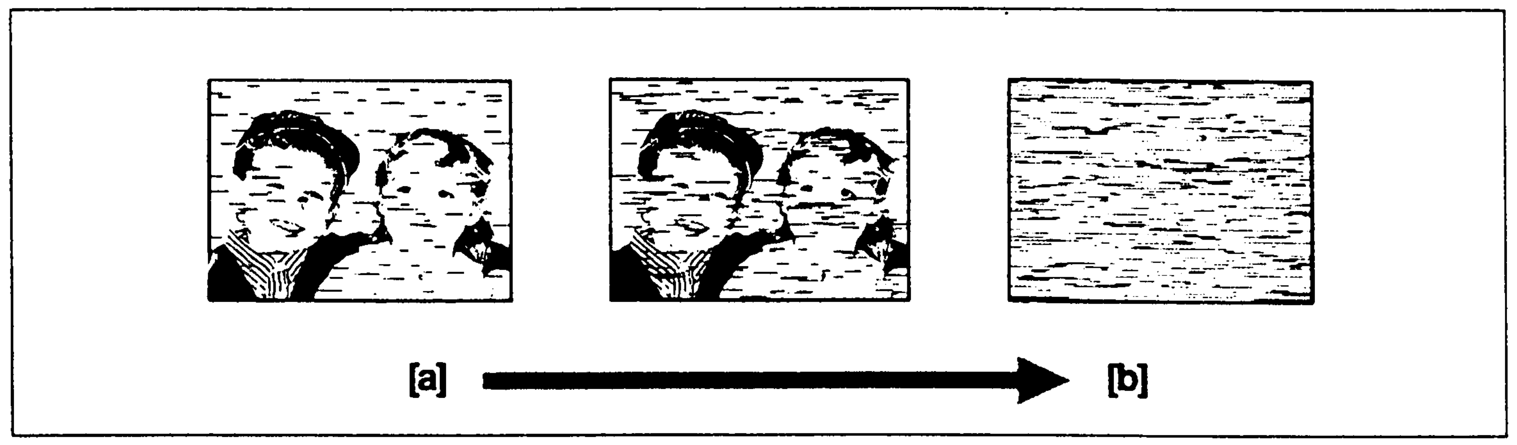
If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
(1) Be sure to tightly seal the plastic bag containing the camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

Video Head Cleaning

To ensure normal recording and clear pictures, clean the video heads often. When the ⊗ indicator in the viewfinder flashes or playback pictures are "noisy" or hardly visible, the video heads may be dirty.



[a] Slightly dirty
[b] Very dirty

If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy," repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution

Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

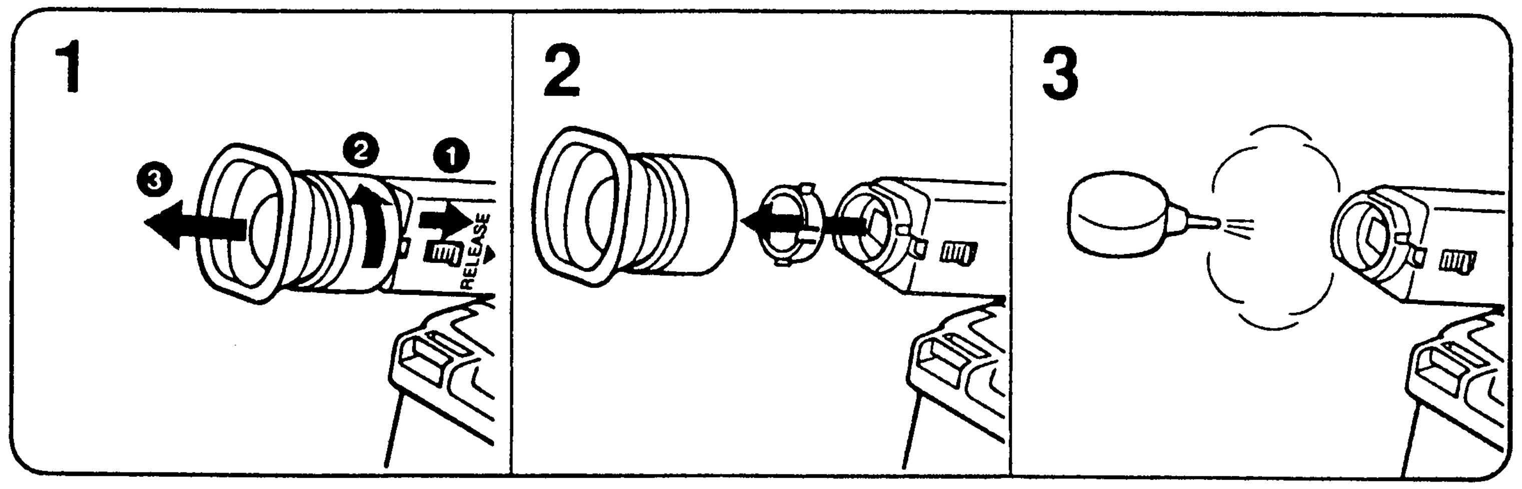
Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

Removing Dust from Inside the Viewfinder

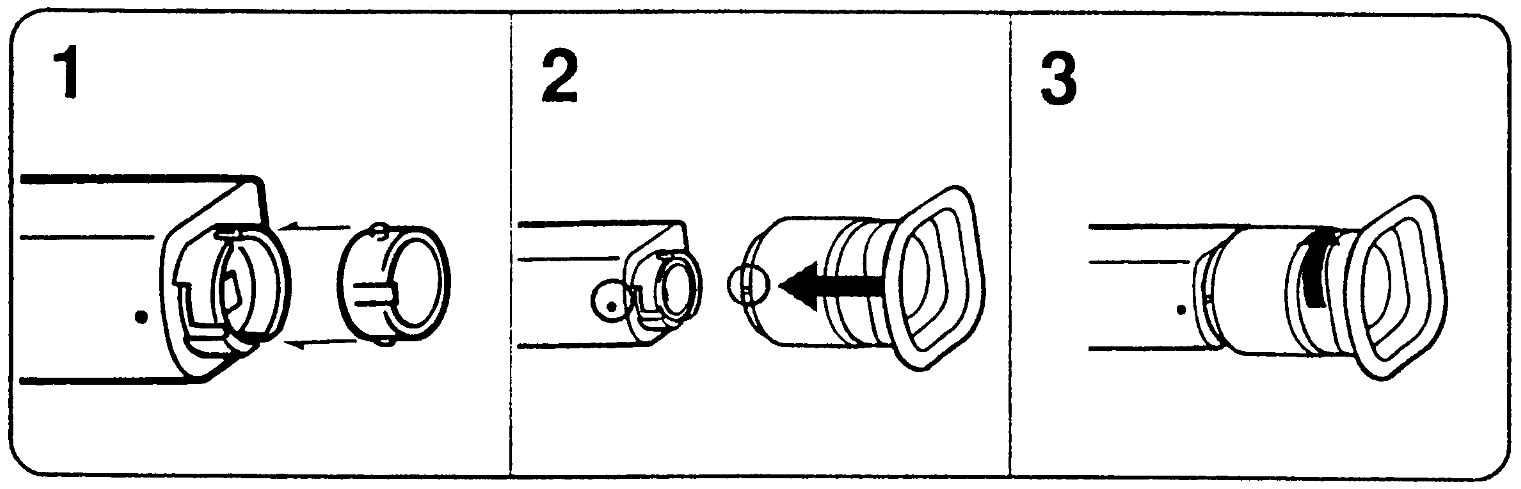
When Using a Monochrome Viewfinder — For CCD-FX240

(1) While holding down the switch on the viewfinder barrel, turn the eyecup in the direction of the arrow and pull it out.
(2) Remove the small lens from inside the viewfinder.
(3) Clean the surface with a commercially available blower.



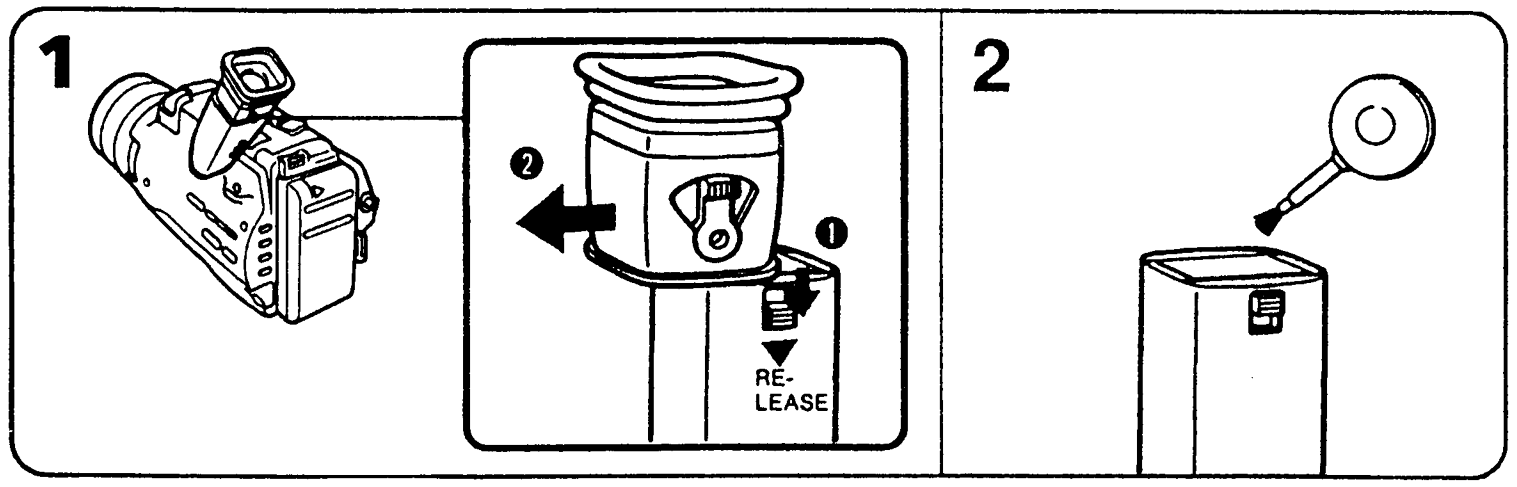
To Reattach the Eyecup

(1) Replace the small lens inside the viewfinder. Be sure to replace it with the correct side.
(2) Align the groove on the eyecup with the ● mark on the barrel.
(3) Turn the eyecup clockwise.



When Using a Color Viewfinder — For CCD-FX340/FX640

(1) While pressing down the hook, slide the viewfinder barrel in the direction of the arrow and remove it from the viewfinder.
(2) Clean the surface with a commercially available blower.



To reattach the viewfinder barrel

Slide the viewfinder barrel in the opposite direction of the arrow in the above illustration.

Maintenance Information and Precautions

Precautions

Camcorder Operation

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid get inside the casing, unplug the camcorder and have it checked by Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.

On Handling Tapes

Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, if the tab is out or in, etc.

Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

AC Power Adaptor

Charging

- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery pack on a flat surface without vibration.
- The battery pack will get hot during charging. This is normal.

Others

- Model for the USA and Canada: One blade of the plug is wider than the other for safety purposes and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

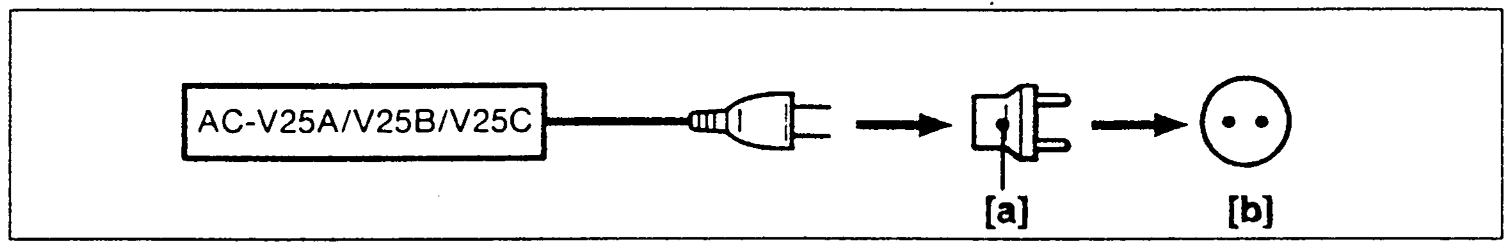
If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electric and TV color systems. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.
Use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.



Difference in Color Systems

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV or a PAL-M system based TV with an NTSC/PAL-M transcoder.
Check the following list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

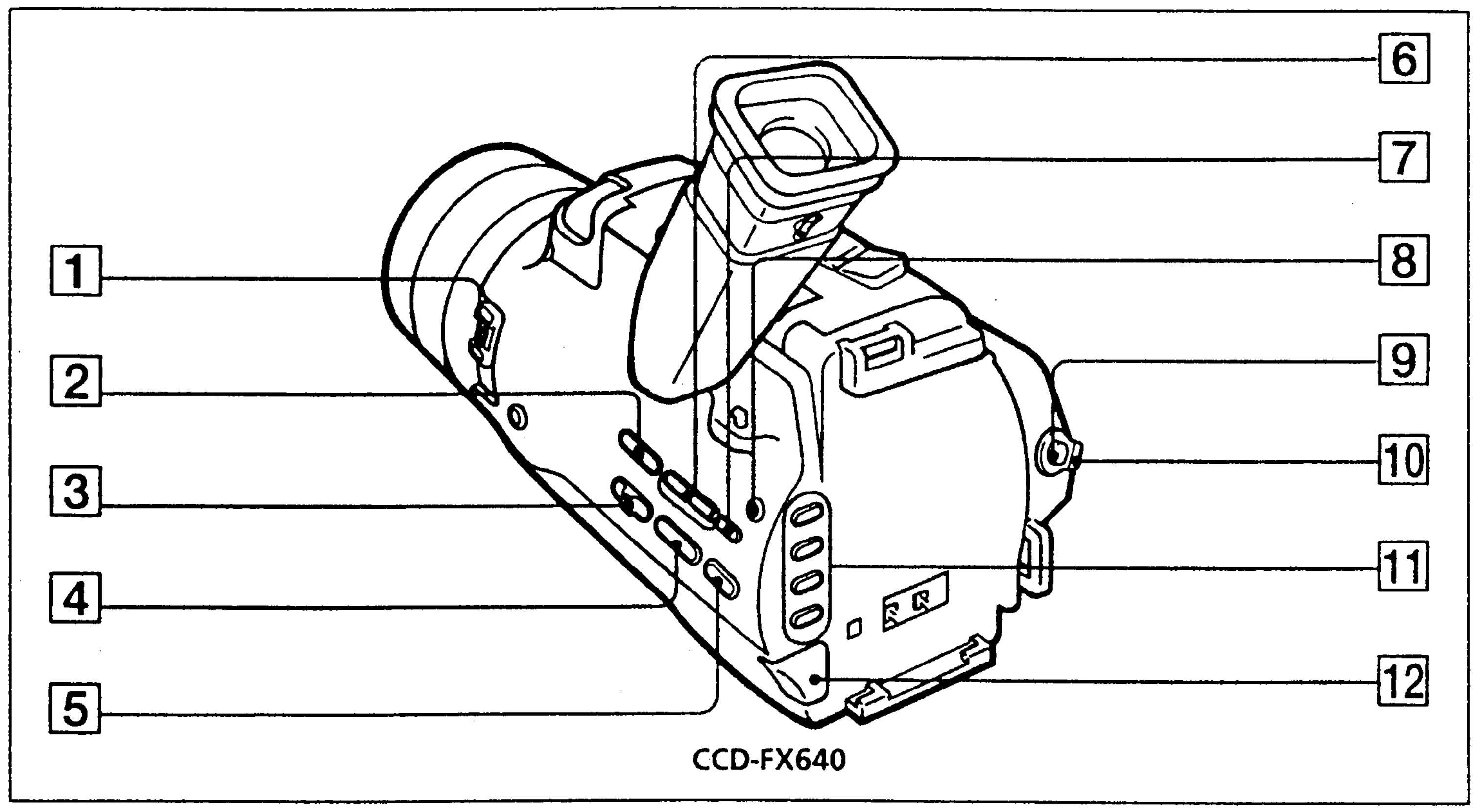
PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

SECAM system countries
Bulgaria, Czeck Republic, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Slovak Republic, Ukraine, etc.

Identifying the Parts



CCD-FX640

1 **POWER switch** (p. 11, 17)

2 **EDITSEARCH button** (p. 15)

3 **STEADY SHOT switch** (**CCD-FX640** only) (p. 27)

4 **PROGRAM AE button** (p. 25)

5 **BACK LIGHT button** (p. 24)

6 **DATE (+) and TIME (NEXT) buttons** (p. 20)

7 **AGE/EVENT button** (p. 21)

8 **COUNTER RESET button** (p. 12)

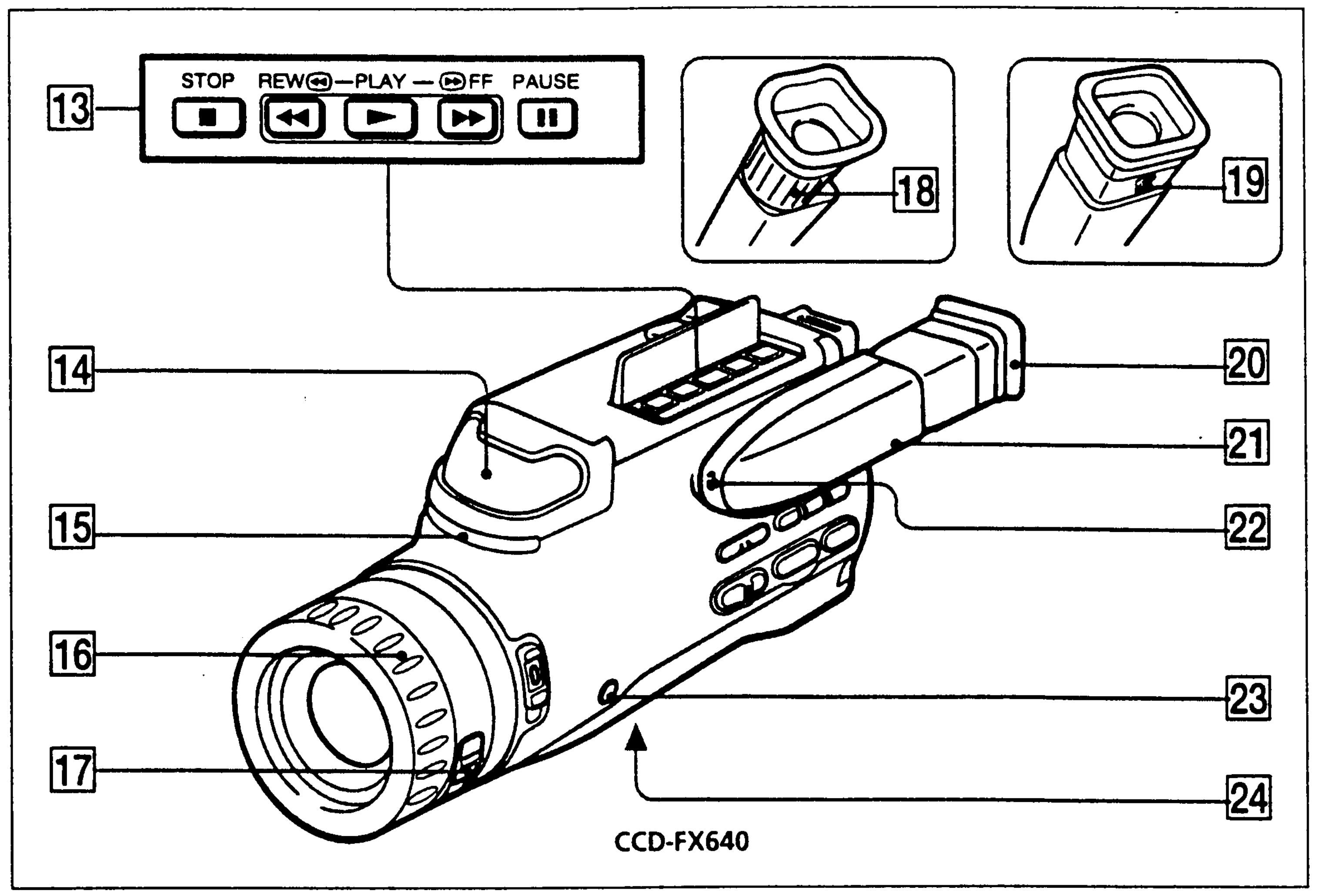
9 **START/STOP button** (p. 11)

10 **STANDBY switch** (p. 11)

11 **Menu operation buttons** (p. 30)

12 **BATT (battery eject) knob** (p. 8)

Identifying the Parts



CCD-FX640

13 **Tape transport buttons** (p. 17)
- ■ (stop)
- ◀◀ REW (rewind)
- ▶ (playback)
- ▶▶ FF (fastforward)
- II PAUSE

14 **Built-in microphone**

15 **Remote sensor** (p. 52)
Aim the Remote Commander here for remote control.

16 **Focus ring (CCD-FX640 only)** (p. 28)

17 **Focus switch (CCD-FX640 only)** (p. 28)

18 **Viewfinder lens adjustment ring** (**CCD-FX240**) (p. 10)

19 **Viewfinder lens adjustment lever** (**CCD-FX340/FX640**) (p. 10)

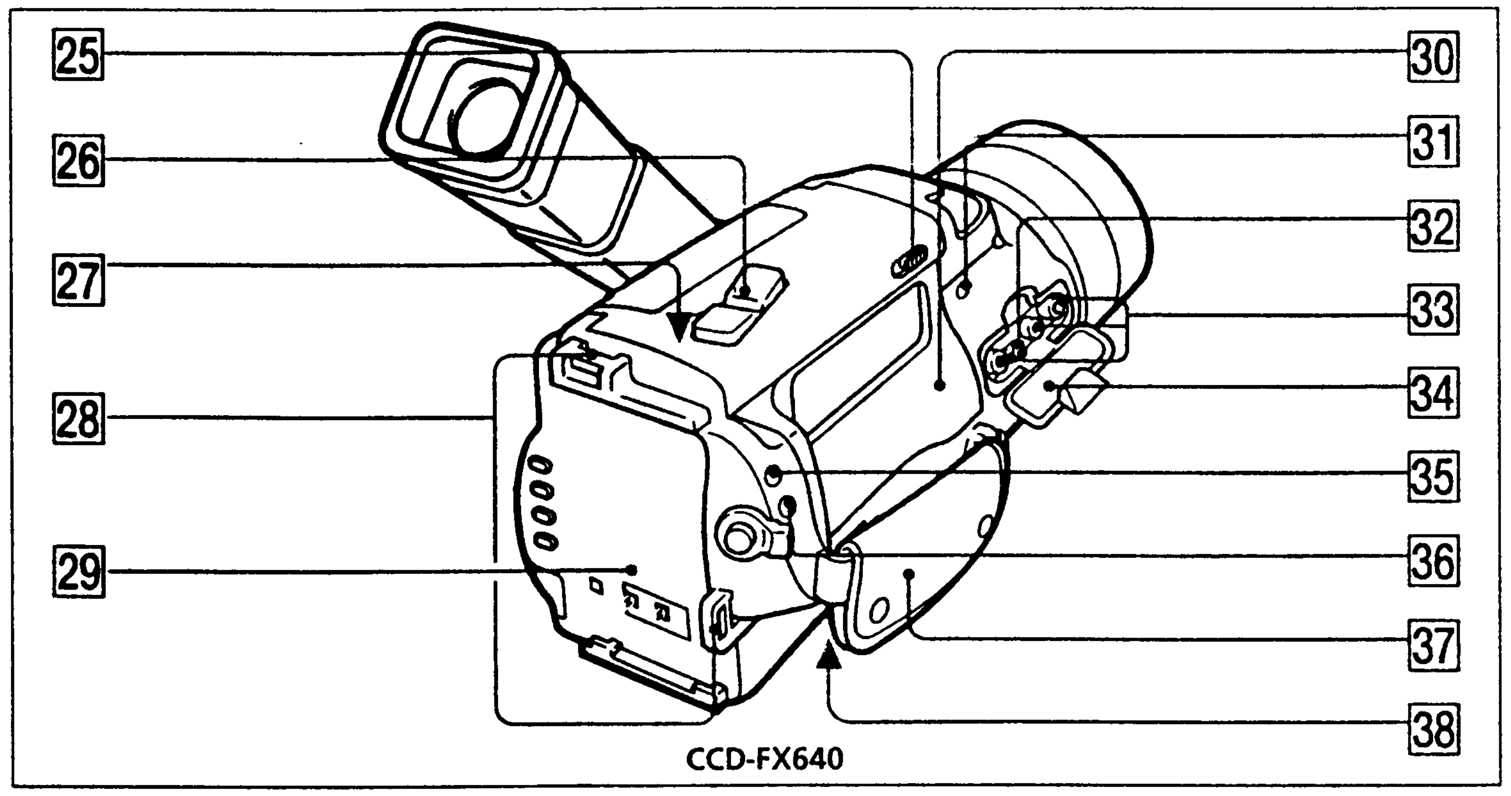
20 **Eyecup**

21 **Viewfinder** (p. 10)

22 **Camera recording/battery lamp**

23 **FADER button** (p. 26)

24 **Tripod receptacle** (p. 14)

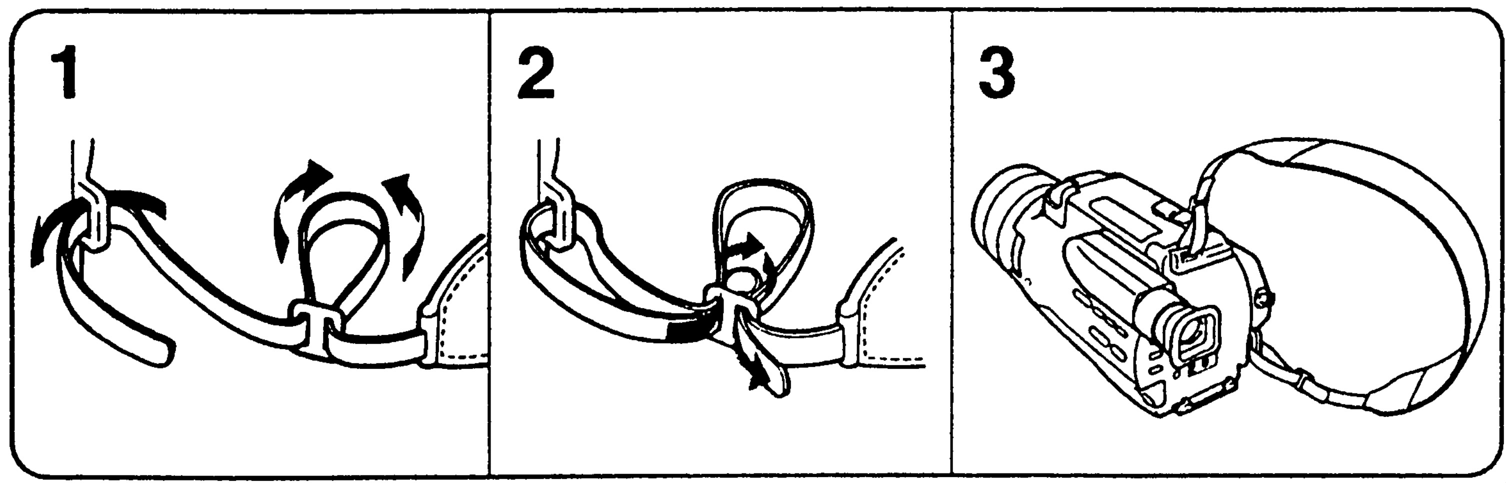


CCD-FX640

- 25 **Lid lock** (p. 9)
- 26 **Power zoom button** (p. 13)
- 27 **Eject button (under the cover)** (p. 9)
- 28 **Hooks for shoulder strap** (See below.)
- 29 **Battery mounting surface** (p. 8)
- 30 **Cassette compartment** (p. 9)
- 31 **MIC jack (PLUG IN POWER)**
  Connect an optional external microphone. This jack also accepts a "plug-in-power" microphone.
- 32 **RFU DC OUT (RFU adaptor DC output) jack** (p. 16)
- 33 **Audio/Video output jacks** (p. 16)
- 34 **Jack cover**
- 35 **LANC ⓛ control jack**
  ⓛ stands for Local Application Control Bus System. The ⓛ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.
- 36 **🎧/🎧 (Earphone/Headphones) jack**
- 37 **Grip strap** (p. 14)
- 38 **Lithium battery compartment** (p. 33)

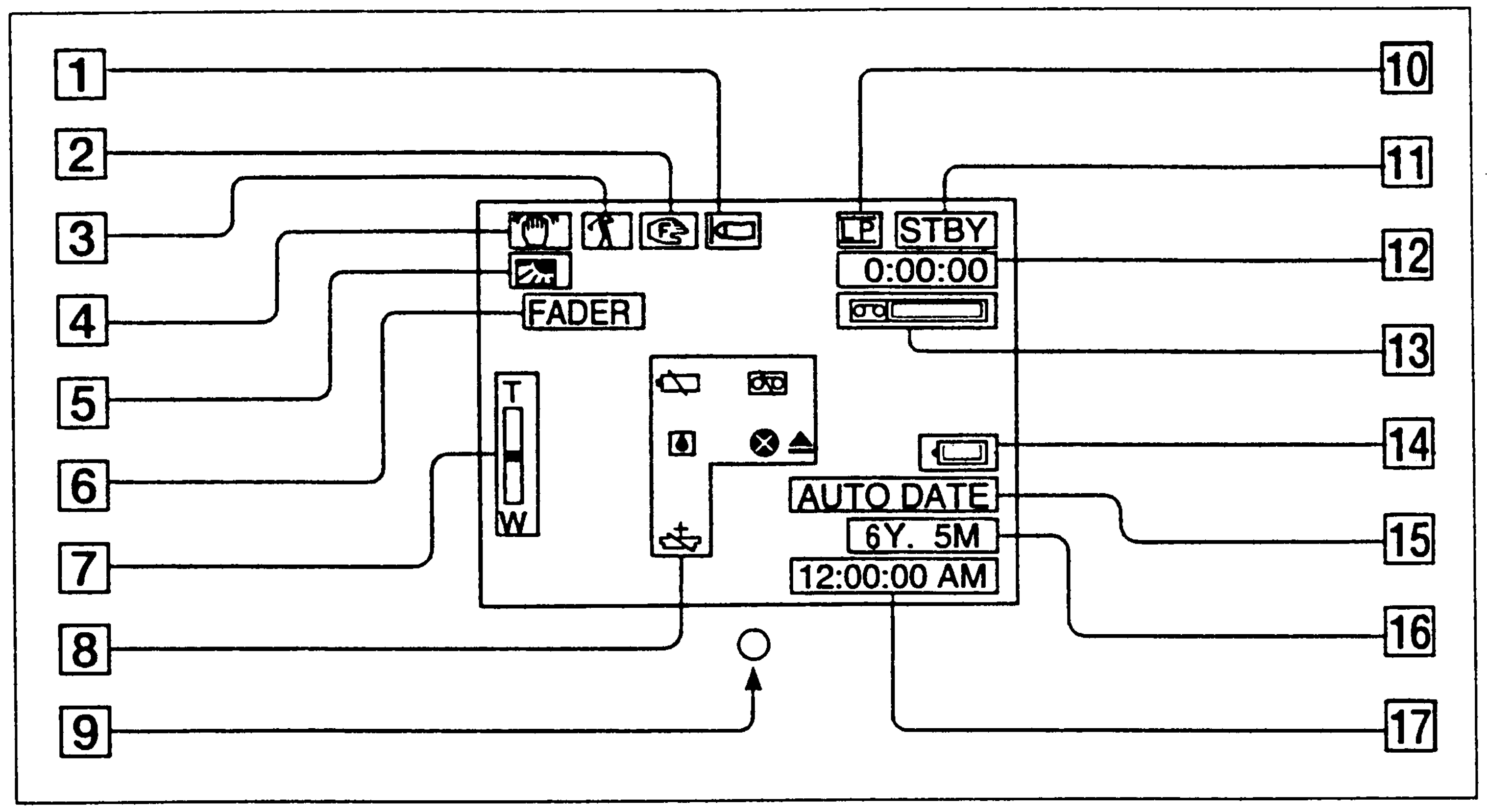
Attaching the Shoulder Strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (28).

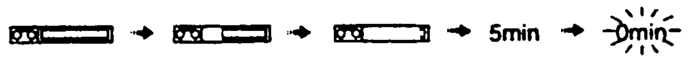


Operation Indicators

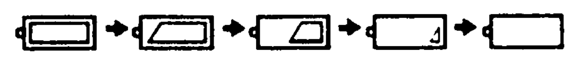
For details on each indicator, refer to the pages indicated in the parentheses.



- 1 **WIND** (p. 31)
  For **CCD-FX640** only
- 2 **Manual focusing indicator** (p. 28)
  For **CCD-FX640** only
- 3 **PROGRAM AE indicator** (p. 25)
- 4 **Steady Shot** (p. 27)
  For **CCD-FX640** only
- 5 **Back Light indicator** (p. 24)
- 6 **FADER indicator** (p. 26)
- 7 **Power zoom indicator** (p. 13)
- 8 **Warning indicators** (p. 53)
- 9 **Recording lamp/Battery lamp** (p. 11)
- 10 **Lights up when playing back a tape recorded in LP mode.**
- 11 **Tape transport mode** (p. 11)
- 12 **Tape counter** (p. 12)
- 13 **Remaining tape indicator**



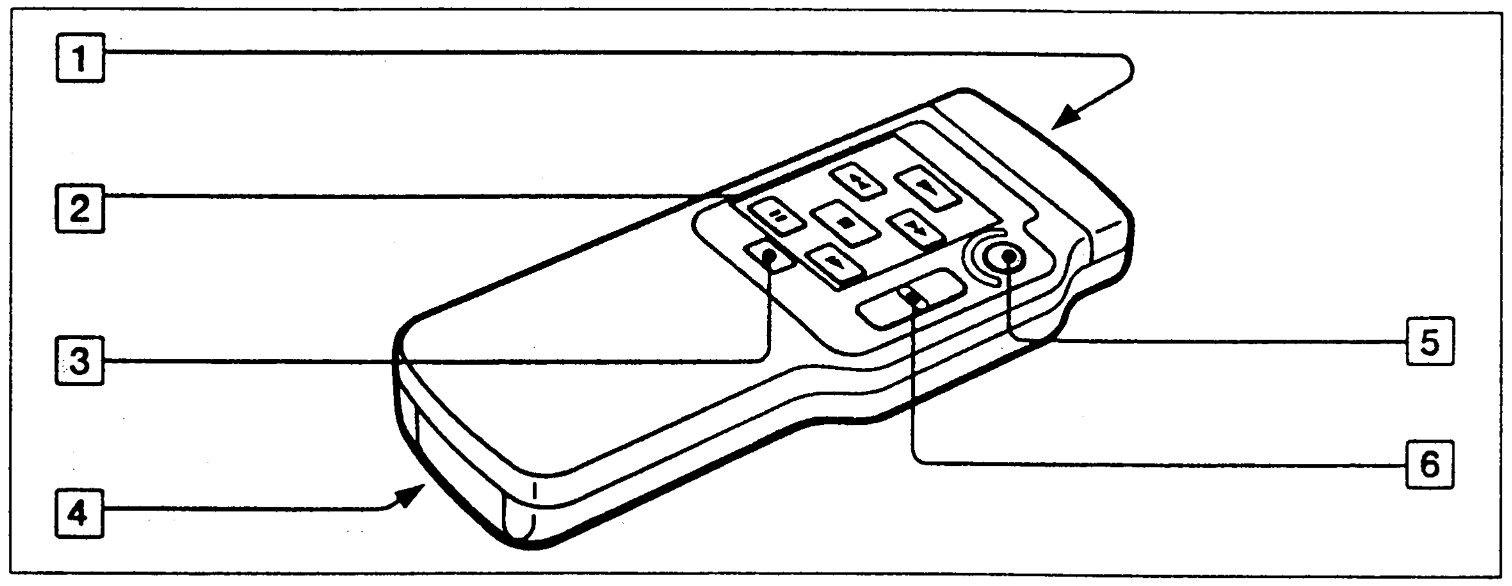
- 14 **Remaining battery indicator** (p. 35, 53)



- 15 **AUTO DATE indicator** (p. 11, 12)
- 16 **AGE/EVENT indicator** (p. 23)
- 17 **Date or Time** (p. 20)

Remote Commander

The buttons that have the same name on the Remote Commander as on the camcorder function identically.



1 **Transmitter**
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.

2 **Tape transport buttons**

3 **DISPLAY button**

4 **Size AA (R6) battery holder**

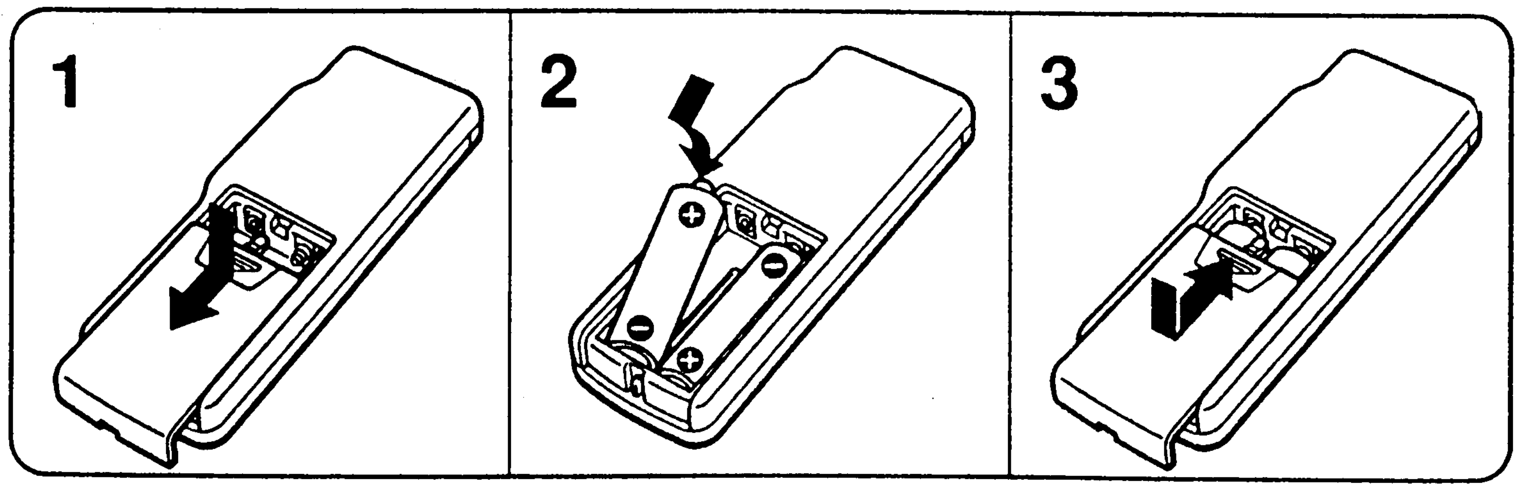
5 **START/STOP button**

6 **Power zoom button**
The zooming speed is unchangeable in the Remote Commander.

Preparing the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.

(1) Remove the battery cover from the Remote Commander.
(2) Insert both of the size AA (R6) batteries with correct polarity.
(3) Put the battery cover back onto the Remote Commander.



Note on battery life

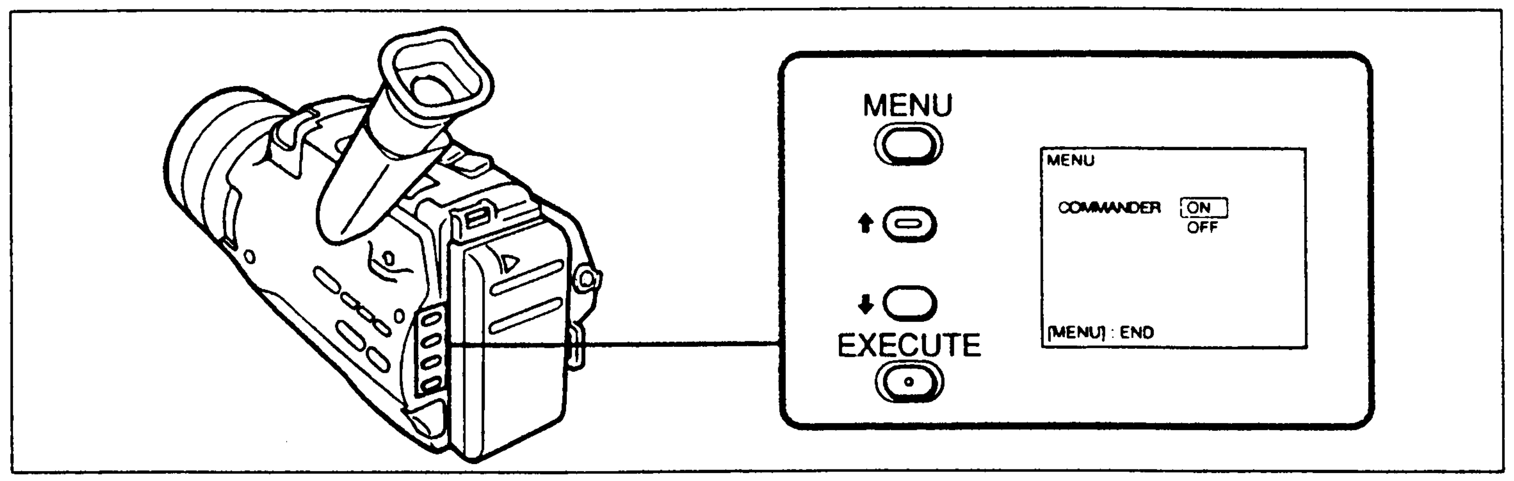
The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

To avoid damage from possible battery leakage

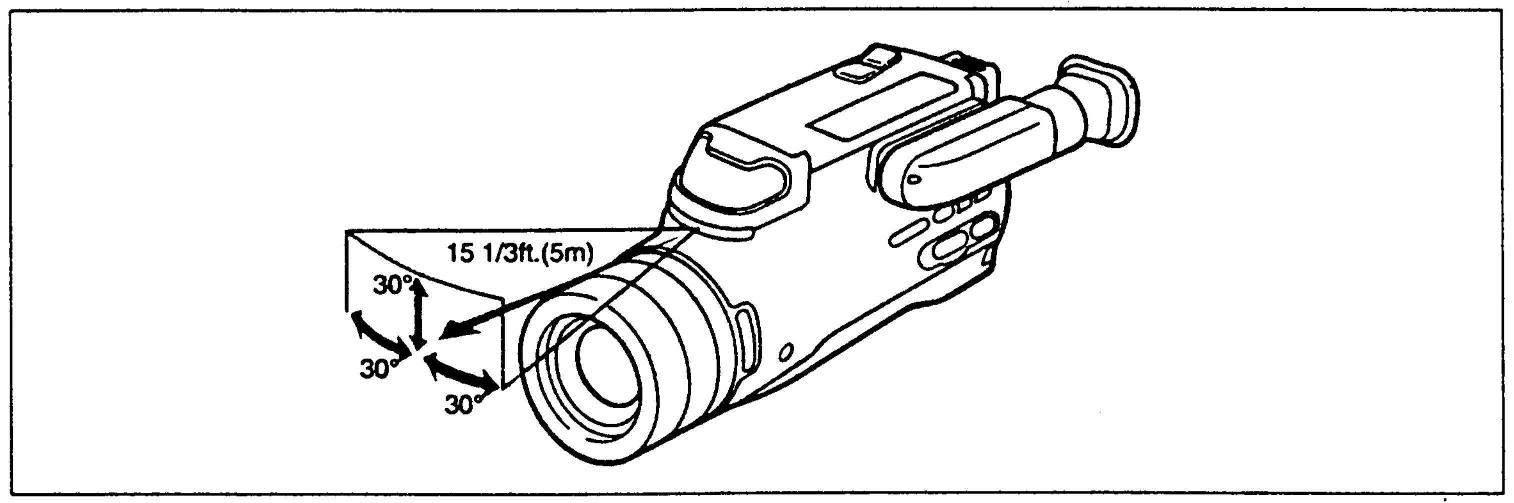
Remove the batteries when you will not use the Remote Commander for a long time.

Using the Remote Commander

Make sure that the COMMANDER mode is set to ON in the menu system.



Remote Control Direction

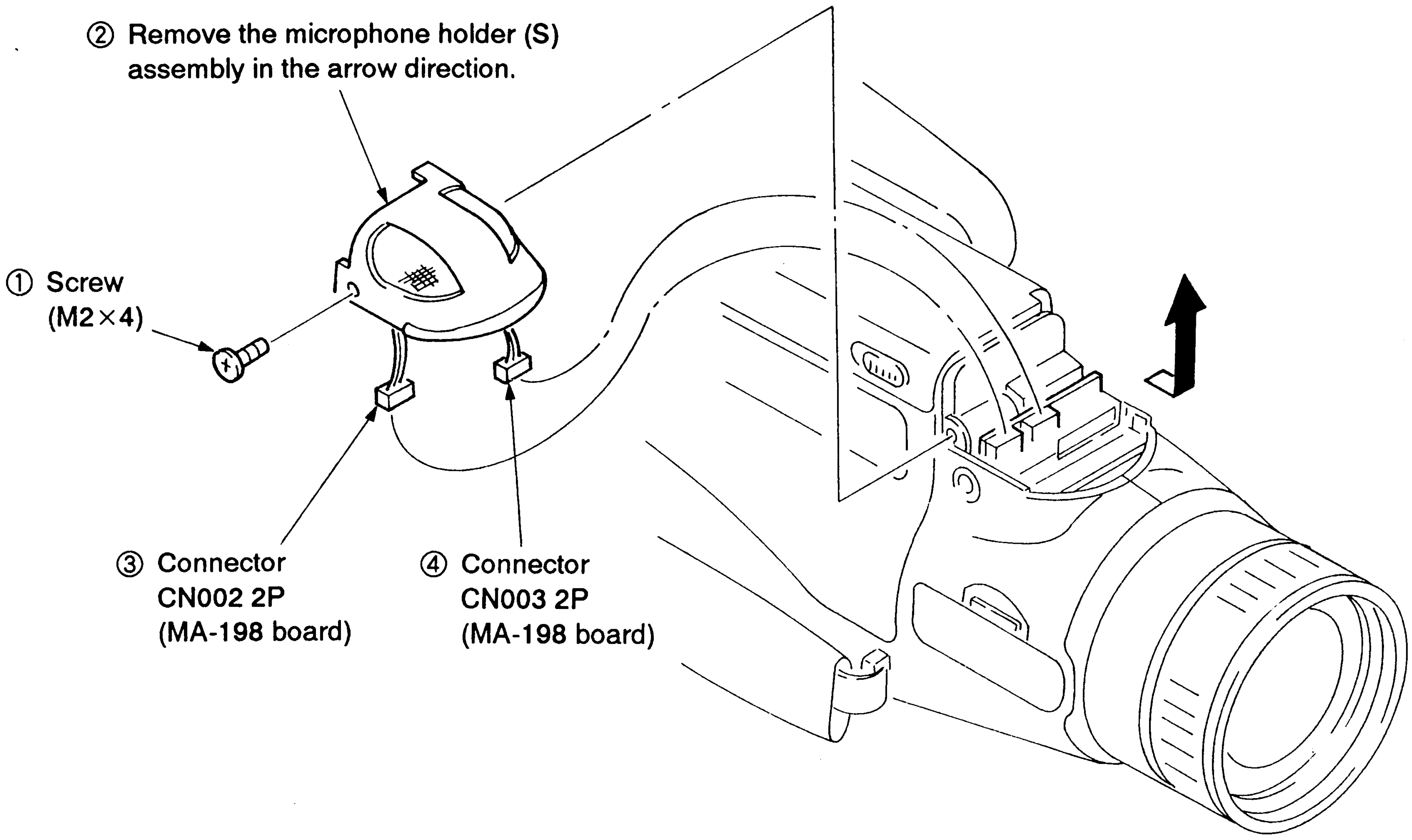


Notes on the Remote Commander

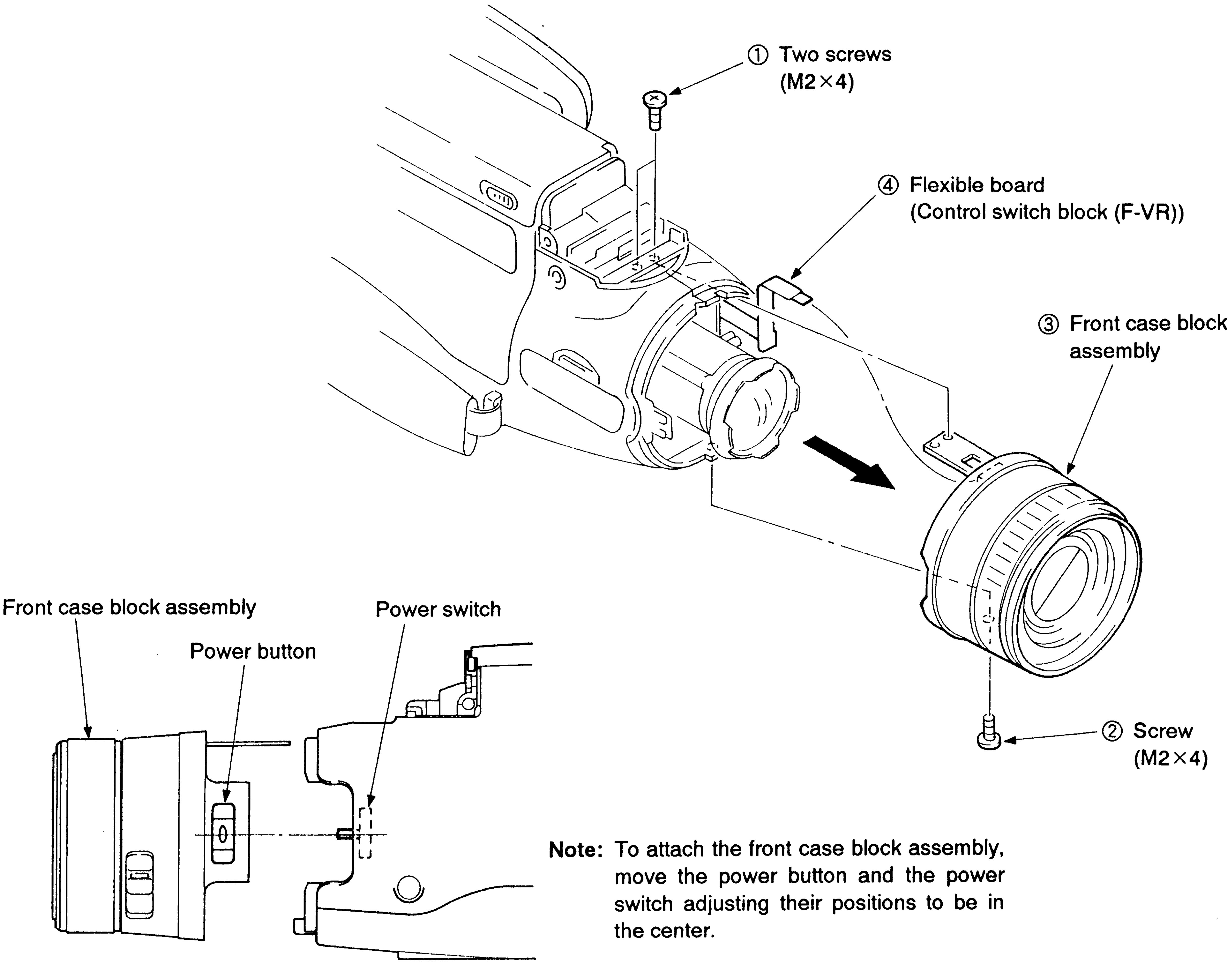
- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1, 2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF MICROPHONE HOLDER (S) ASSEMBLY

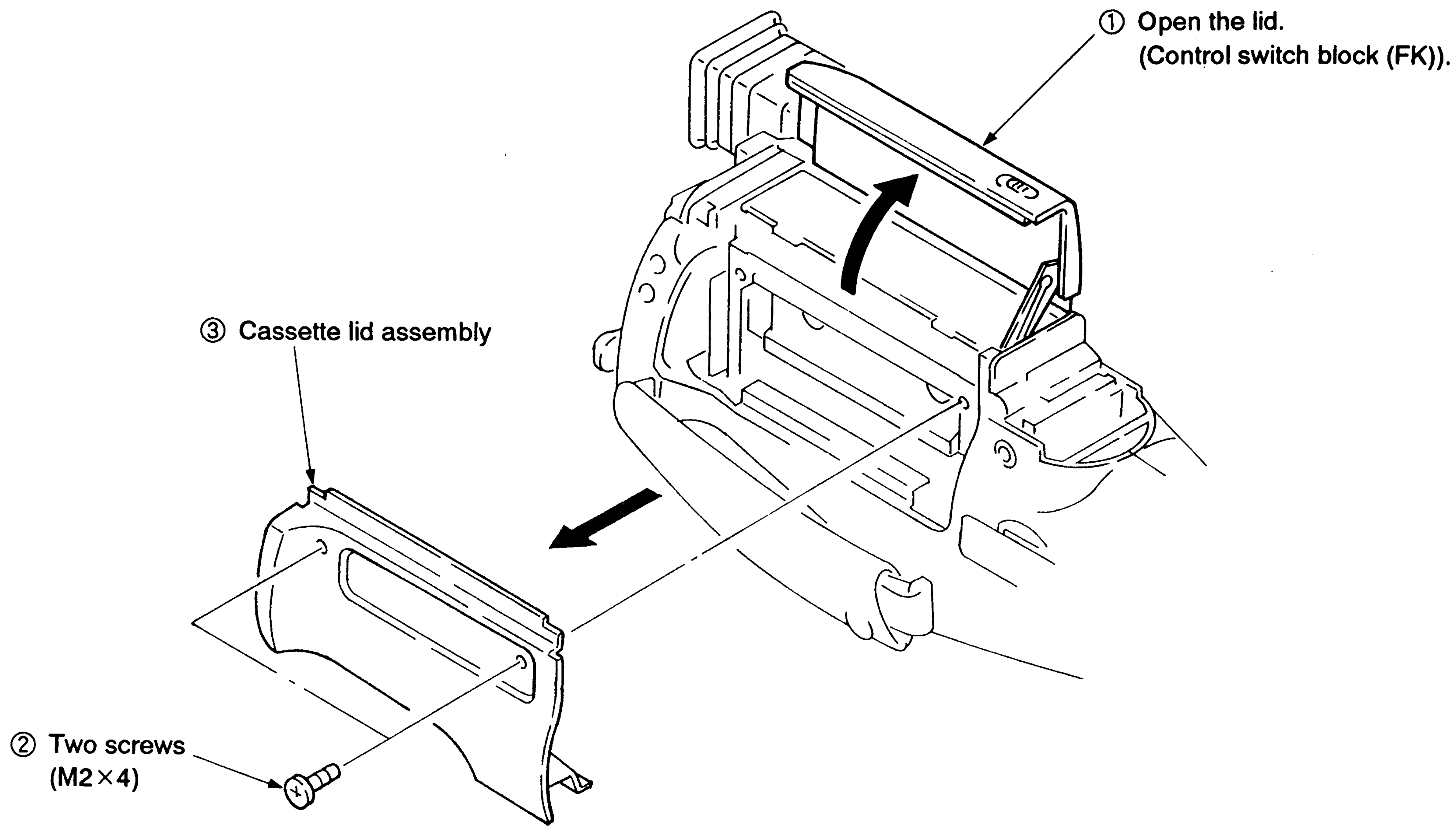

② Remove the microphone holder (S) assembly in the arrow direction.
① Screw (M2×4)
③ Connector CN002 2P (MA-198 board)
④ Connector CN003 2P (MA-198 board)

2-2. REMOVAL OF FRONT CASE BLOCK ASSEMBLY

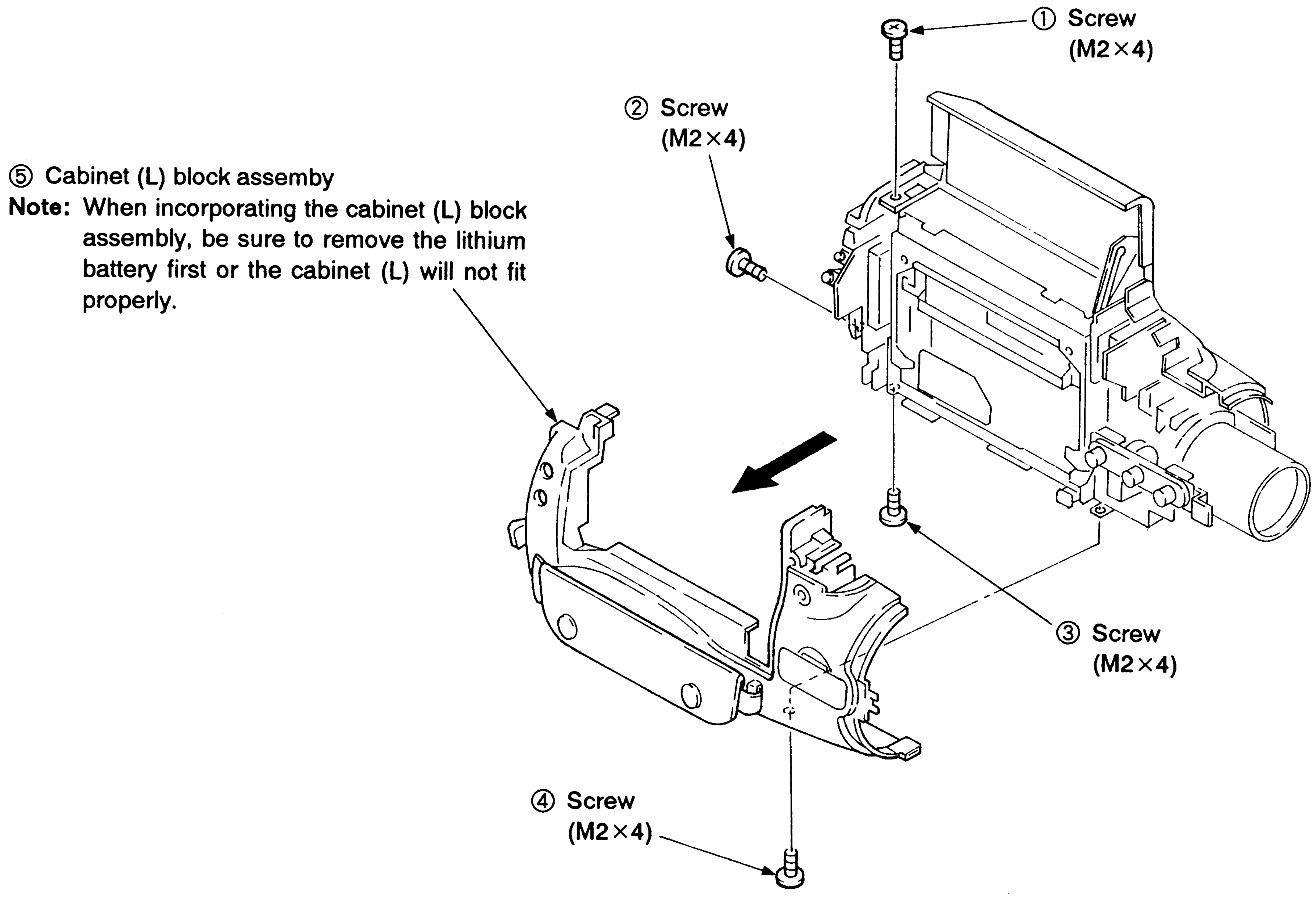

① Two screws (M2×4)
④ Flexible board (Control switch block (F-VR))
③ Front case block assembly
② Screw (M2×4)
Front case block assembly
Power button
Power switch

Note: To attach the front case block assembly, move the power button and the power switch adjusting their positions to be in the center.

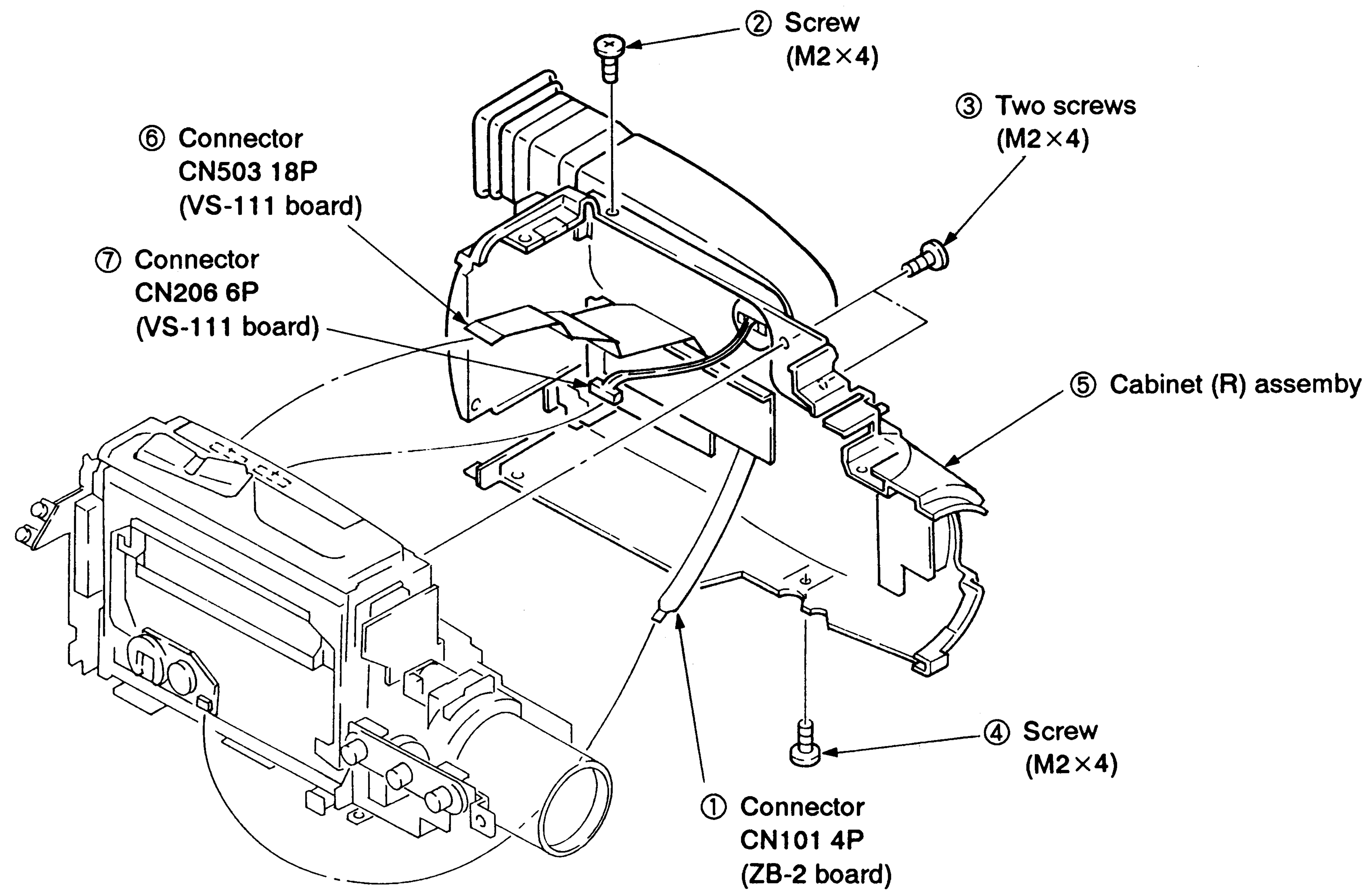
2-3. REMOVAL OF CASSETTE LID ASSEMBLY


① Open the lid.
(Control switch block (FK)).
③ Cassette lid assembly
② Two screws
(M2×4)

2-4. REMOVAL OF CABINET (L) BLOCK ASSEMBLY

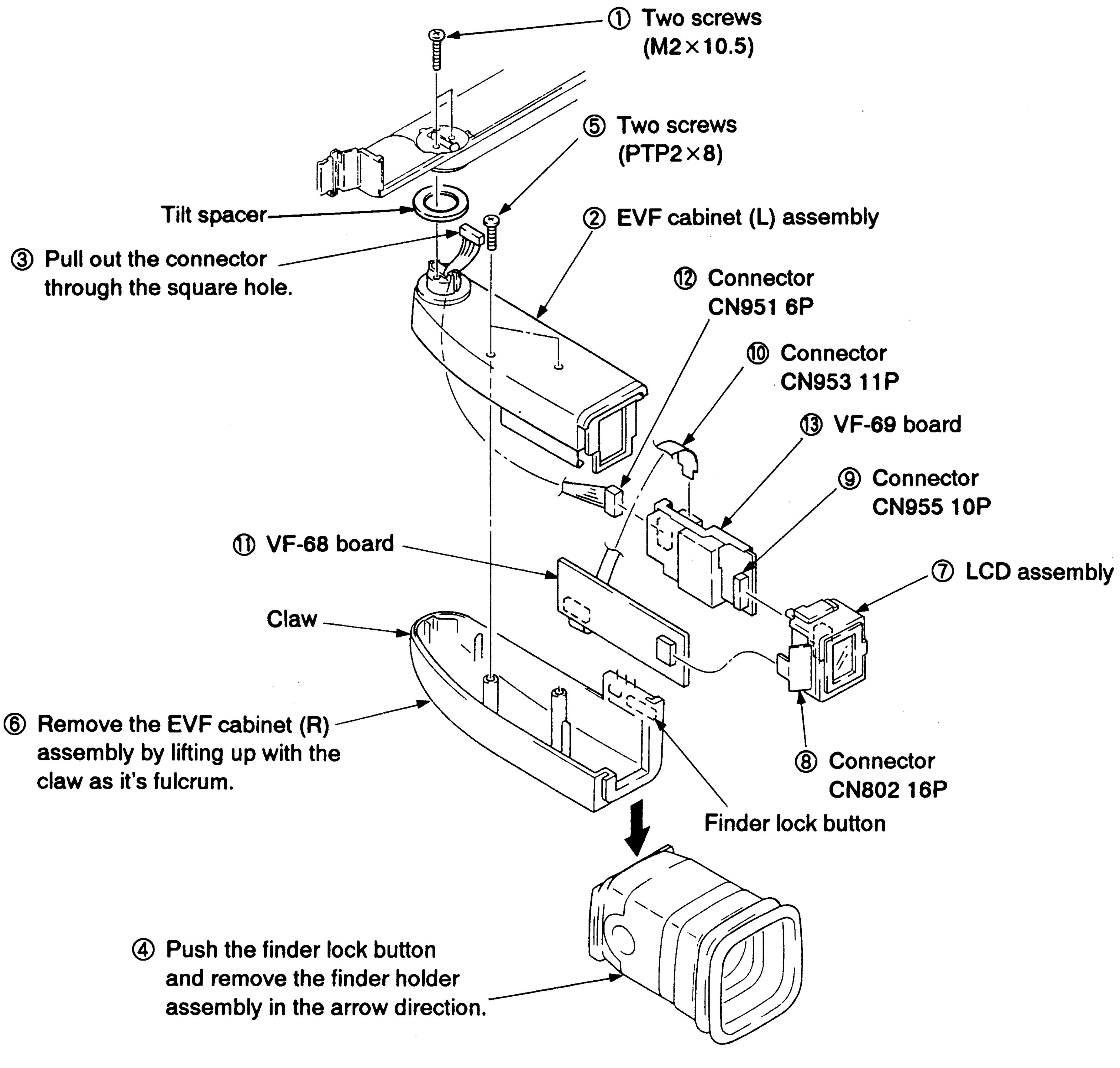

① Screw
(M2×4)
② Screw
(M2×4)
⑤ Cabinet (L) block assemby
Note: When incorporating the cabinet (L) block assembly, be sure to remove the lithium battery first or the cabinet (L) will not fit properly.
③ Screw
(M2×4)
④ Screw
(M2×4)

2-5. REMOVAL OF CABINET (R) BLOCK ASSEMBLY



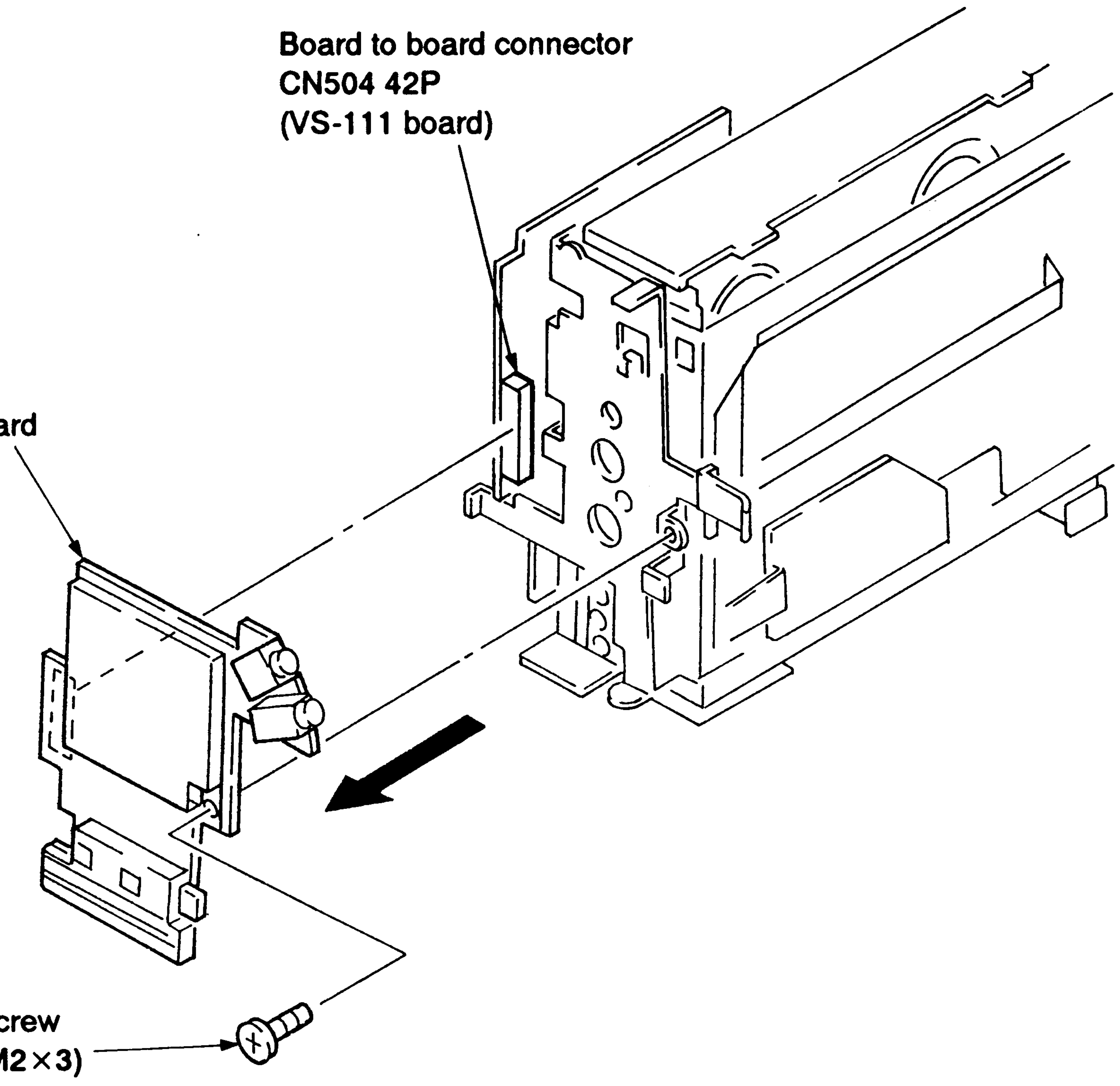
② Screw
(M2×4)
③ Two screws
(M2×4)
⑥ Connector
CN503 18P
(VS-111 board)
⑦ Connector
CN206 6P
(VS-111 board)
⑤ Cabinet (R) assemby
④ Screw
(M2×4)
① Connector
CN101 4P
(ZB-2 board)

2-6. REMOVAL OF EVF ASSEMBLY



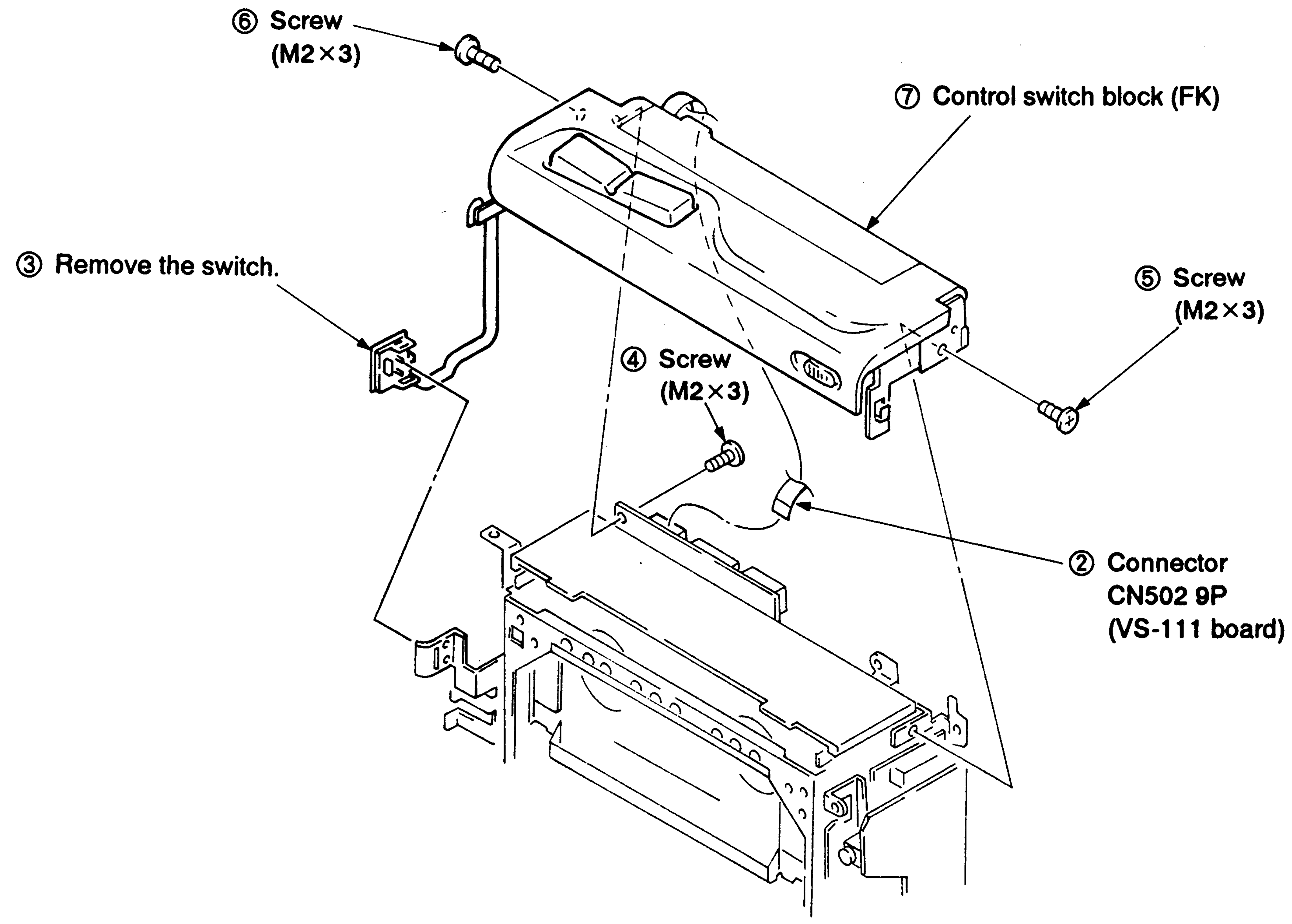
① Two screws
(M2×10.5)
⑤ Two screws
(PTP2×8)
Tilt spacer
③ Pull out the connector
through the square hole.
② EVF cabinet (L) assembly
⑫ Connector
CN951 6P
⑩ Connector
CN953 11P
⑬ VF-69 board
⑨ Connector
CN955 10P
⑪ VF-68 board
⑦ LCD assembly
Claw
⑥ Remove the EVF cabinet (R)
assembly by lifting up with the
claw as it's fulcrum.
⑧ Connector
CN802 16P
Finder lock button
④ Push the finder lock button
and remove the finder holder
assembly in the arrow direction.

2-7. REMOVAL OF DD-65 BOARD

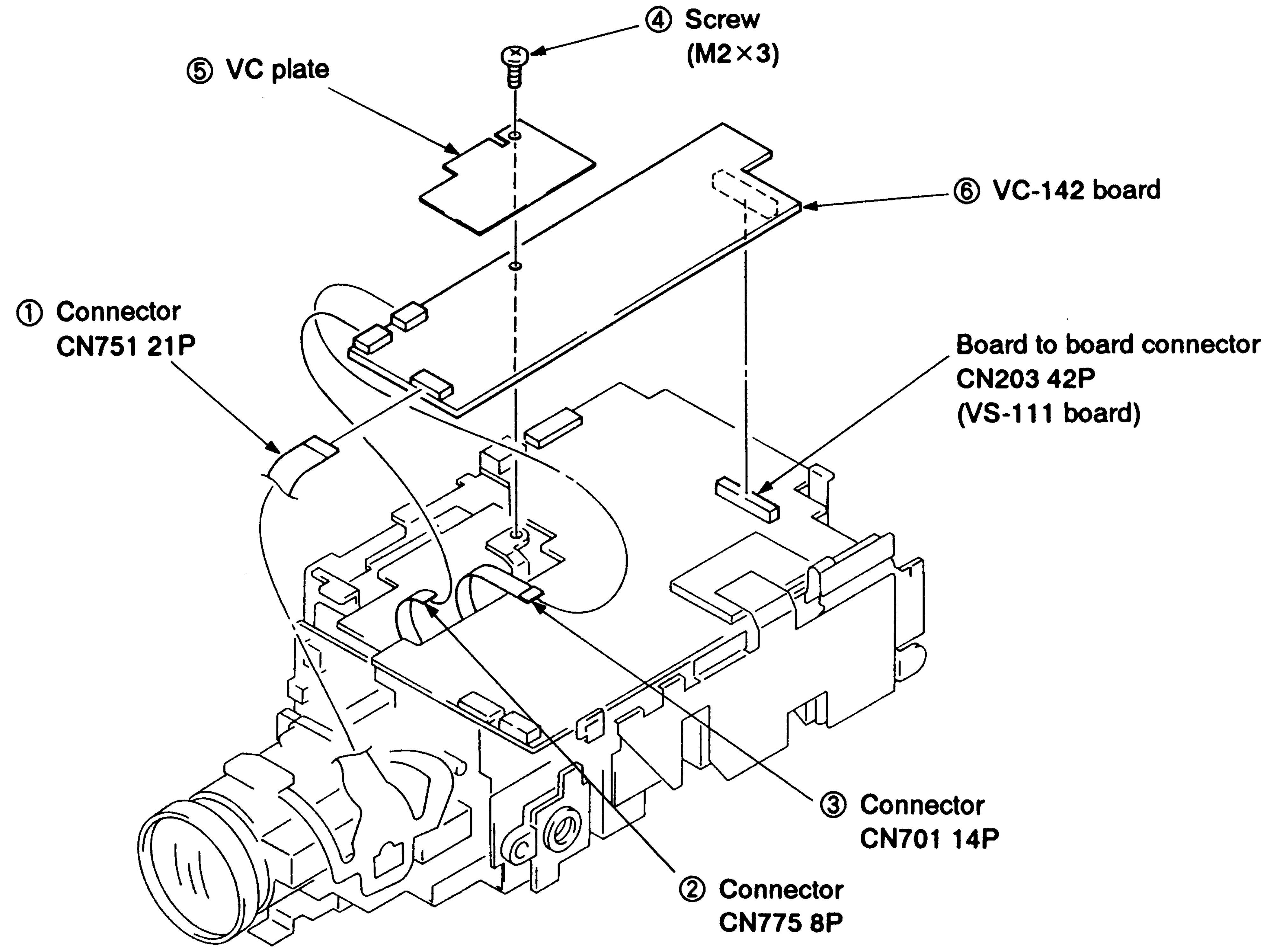

Board to board connector
CN504 42P
(VS-111 board)
② DD-65 board
① Screw
(M2×3)

2-8. REMOVAL OF CONTROL SWITCH BLOCK (FK)

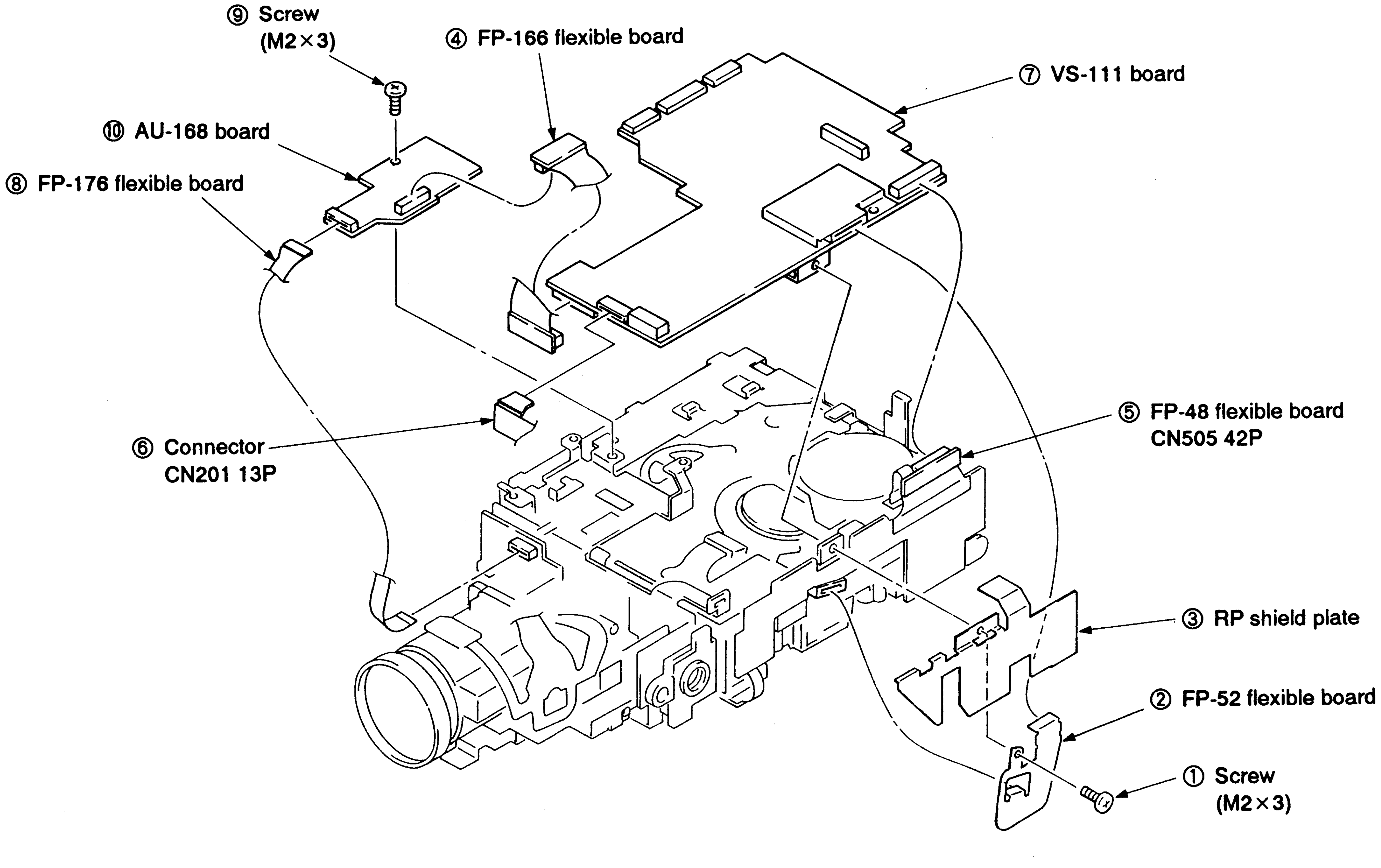
Note: ① Refer to 2-7. and remove the DD-65 board.


⑥ Screw
(M2×3)
⑦ Control switch block (FK)
③ Remove the switch.
⑤ Screw
(M2×3)
④ Screw
(M2×3)
② Connector
CN502 9P
(VS-111 board)

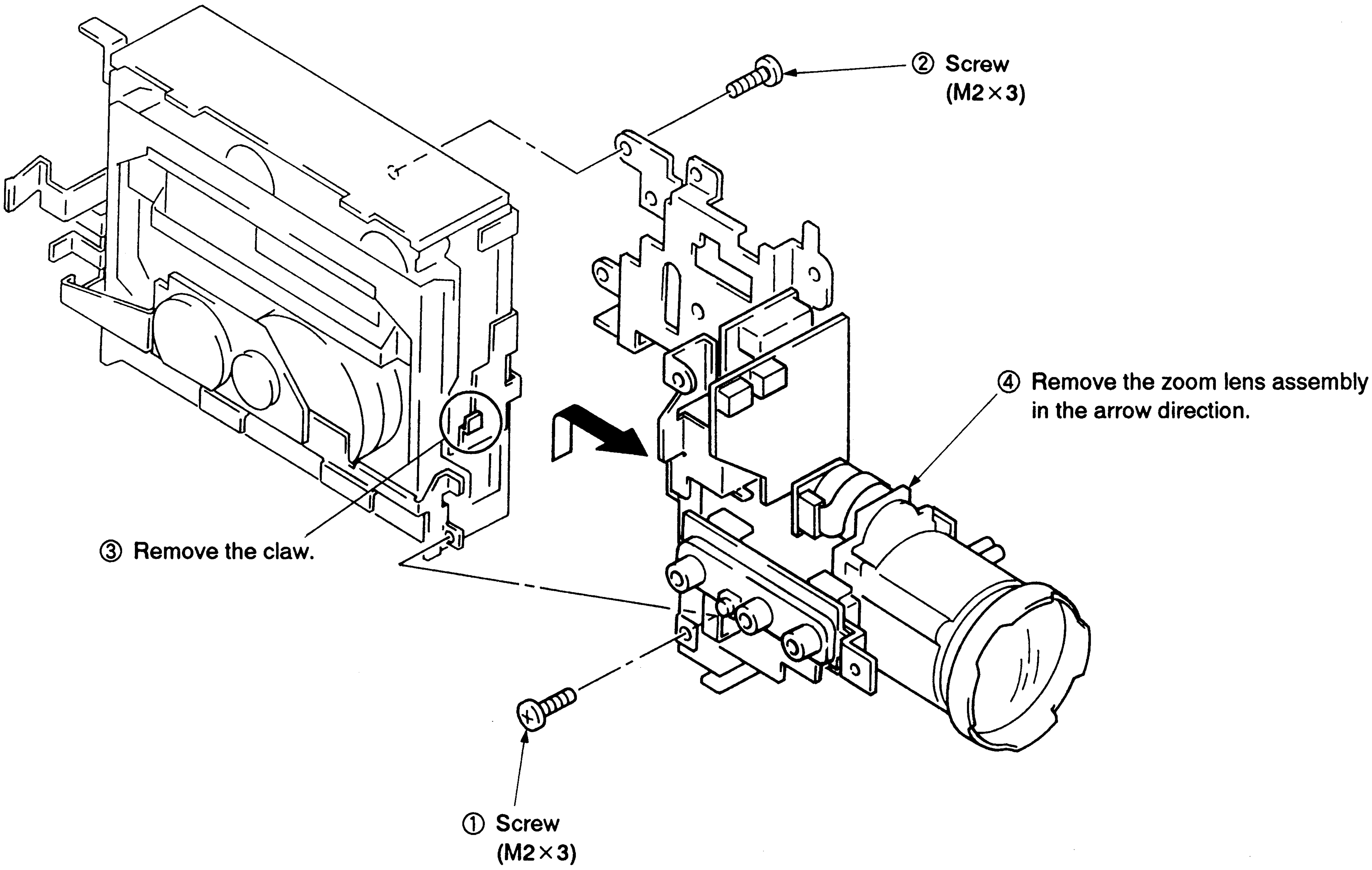
2-9. REMOVAL OF VC-142 BOARD


④ Screw (M2×3)
⑤ VC plate
⑥ VC-142 board
① Connector CN751 21P
Board to board connector CN203 42P (VS-111 board)
③ Connector CN701 14P
② Connector CN775 8P

2-10. REMOVAL OF VS-111 AND AU-168 BOARDS

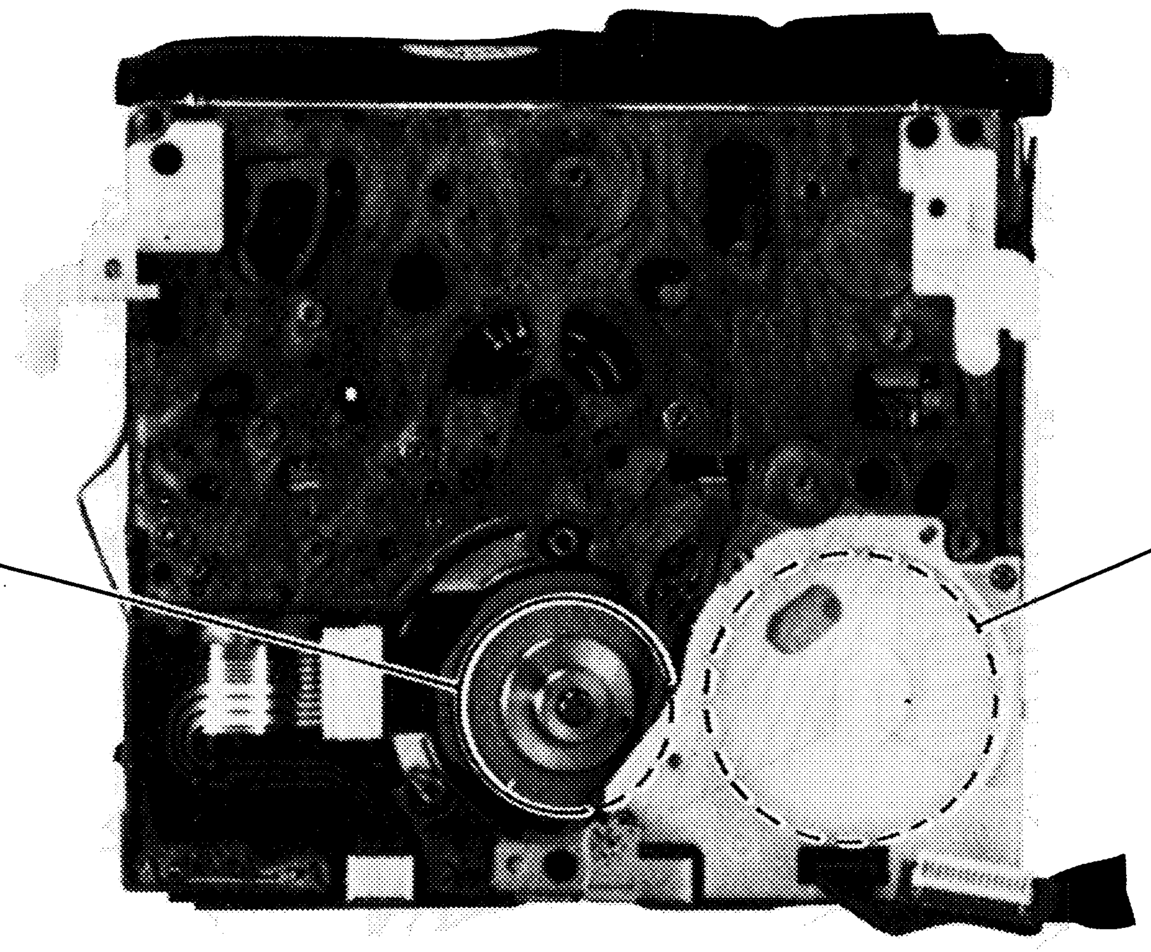

⑨ Screw (M2×3)
④ FP-166 flexible board
⑦ VS-111 board
⑩ AU-168 board
⑧ FP-176 flexible board
⑥ Connector CN201 13P
⑤ FP-48 flexible board CN505 42P
③ RP shield plate
② FP-52 flexible board
① Screw (M2×3)

2-11. REMOVAL OF ZOOM LENS BLOCK ASSEMBLY


② Screw
(M2×3)
④ Remove the zoom lens assembly
in the arrow direction.
③ Remove the claw.
① Screw
(M2×3)

2-12. INTERNAL VIEWS

— Right side —

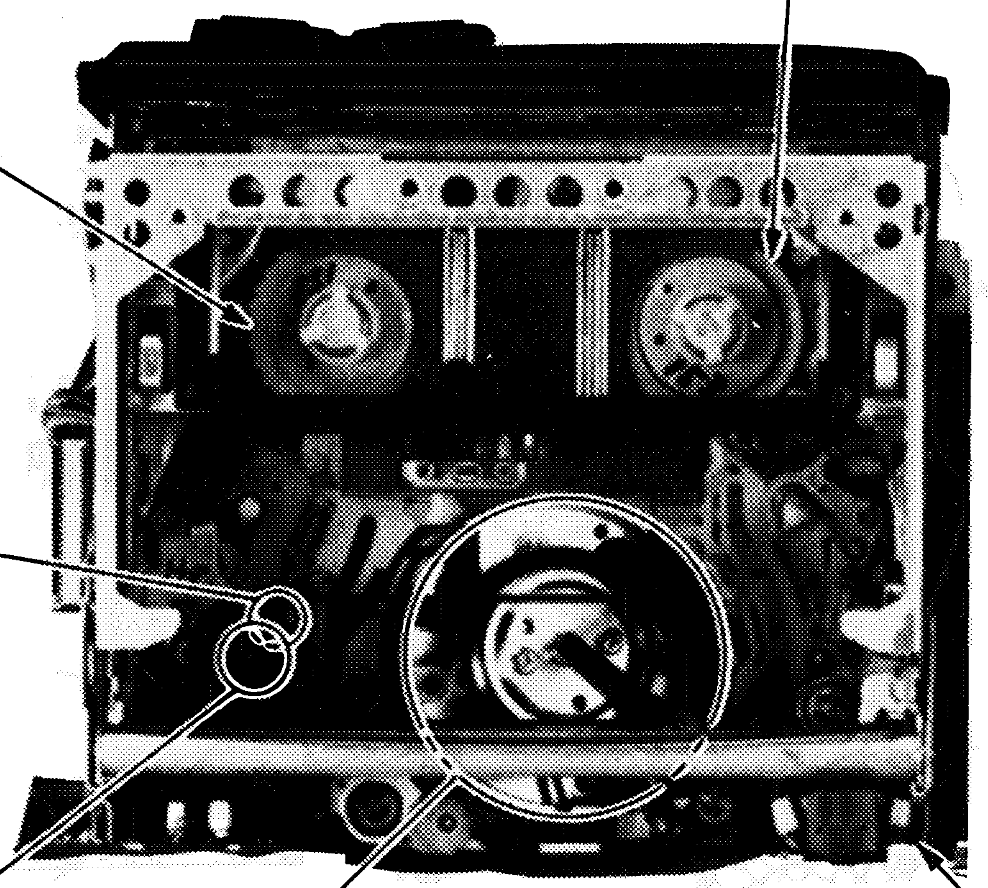


M901
Drum assembly
(DGH-78A-R)
A-7048-564-A

Upper drum assembly
(DGR-78-R)
A-7049-501-A

M902
Capstan motor
8-835-477-12

— Left side —



S reel table assembly
X-3944-116-1

T reel table assembly
X-3941-274-1

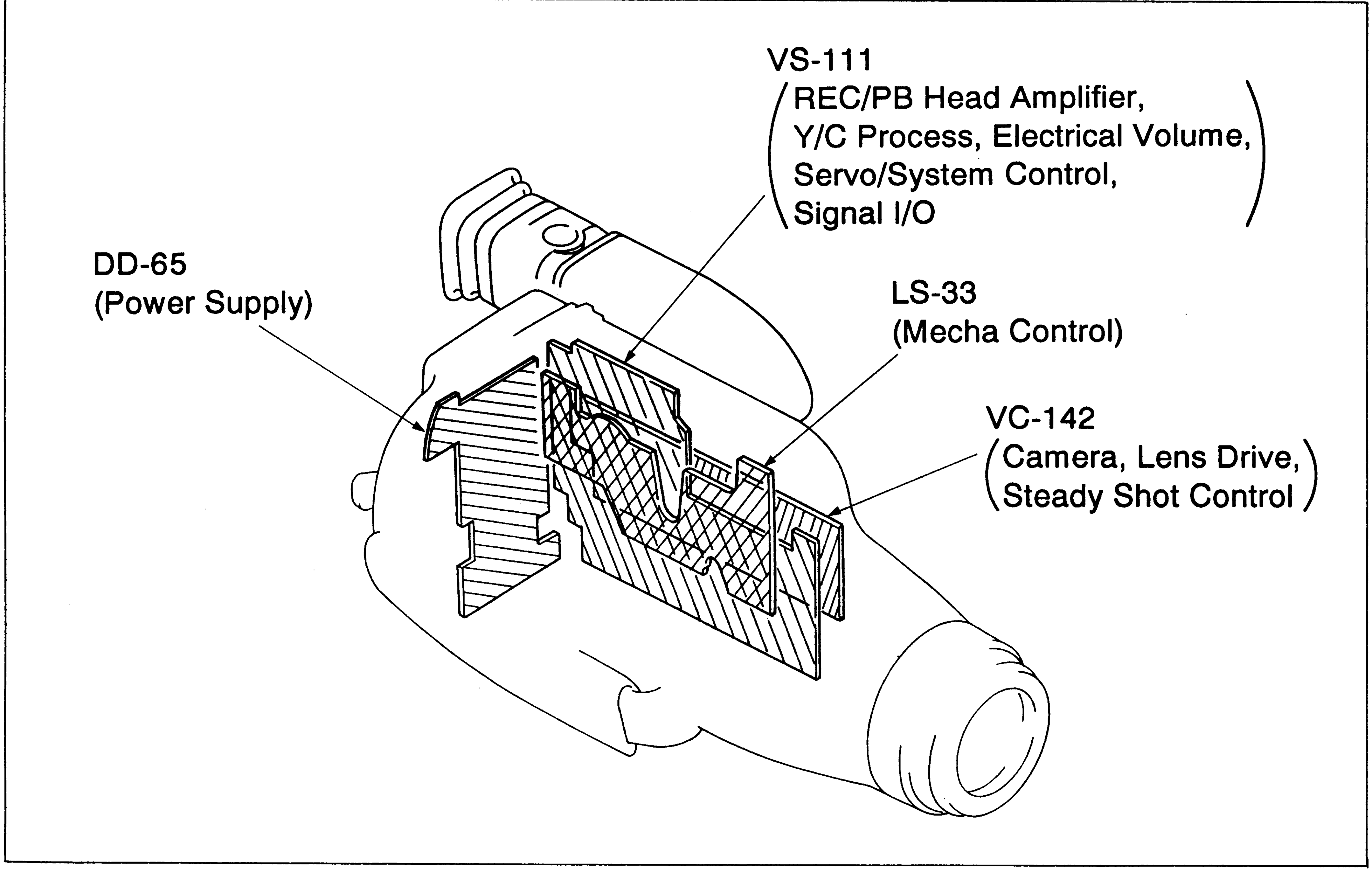
Pinch roller

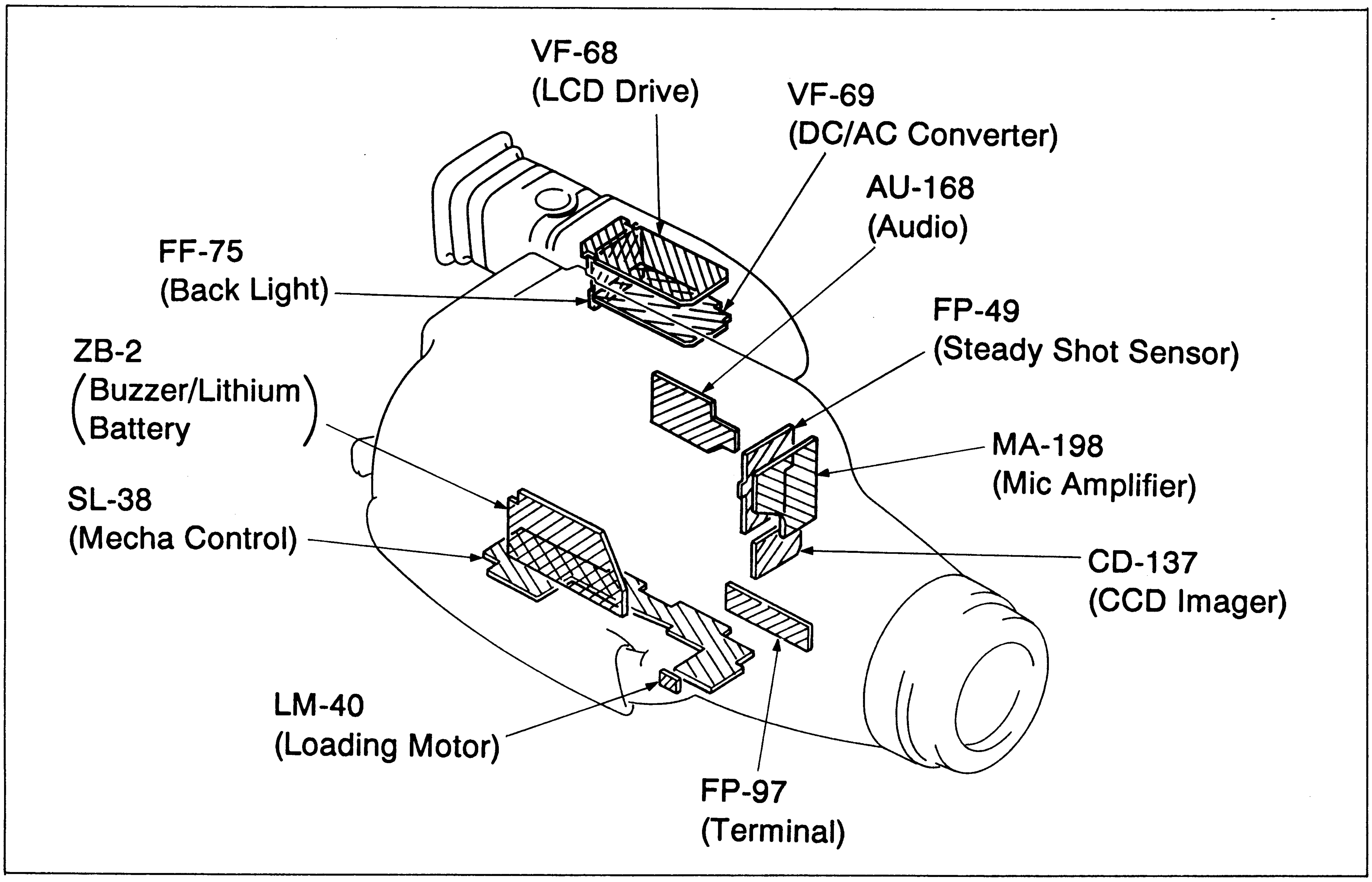
M902
Capstan motor
8-835-477-12

M901
Drum assembly (DGH-78A-R)
A-7048-564-A
Upper drum assembly (DGR-78-R)
A-7049-501-A

M903
Loading motor assembly
A-7040-304-A

2-13. CIRCUIT BOARDS LOCATION


VS-111
(REC/PB Head Amplifier,
Y/C Process, Electrical Volume,
Servo/System Control,
Signal I/O)
DD-65
(Power Supply)
LS-33
(Mecha Control)
VC-142
(Camera, Lens Drive,
Steady Shot Control)


VF-68
(LCD Drive)
VF-69
(DC/AC Converter)
AU-168
(Audio)
FF-75
(Back Light)
FP-49
(Steady Shot Sensor)
ZB-2
(Buzzer/Lithium
Battery)
MA-198
(Mic Amplifier)
SL-38
(Mecha Control)
CD-137
(CCD Imager)
LM-40
(Loading Motor)
FP-97
(Terminal)

SECTION 5
REPAIR PARTS LIST

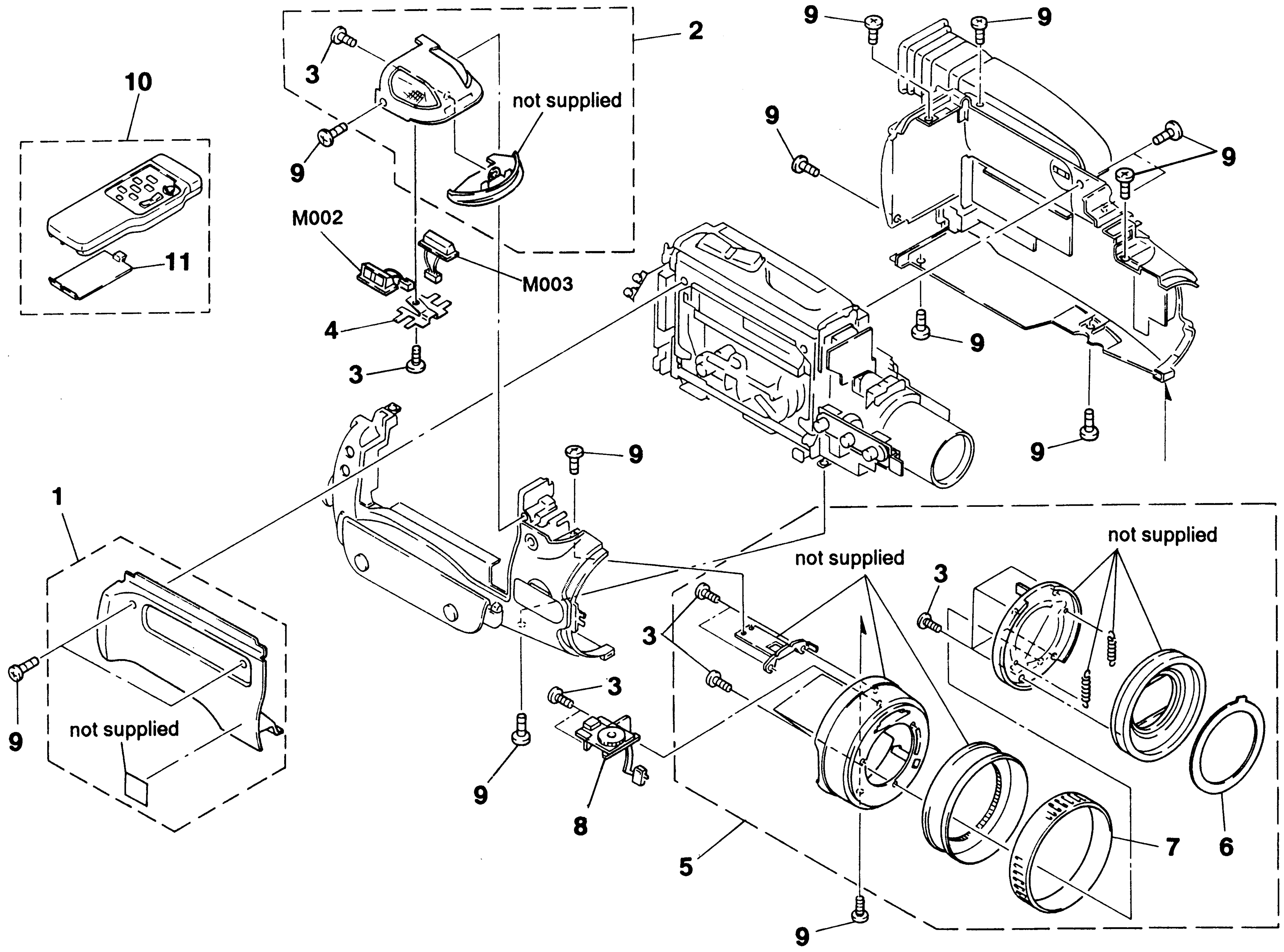
5-1. EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

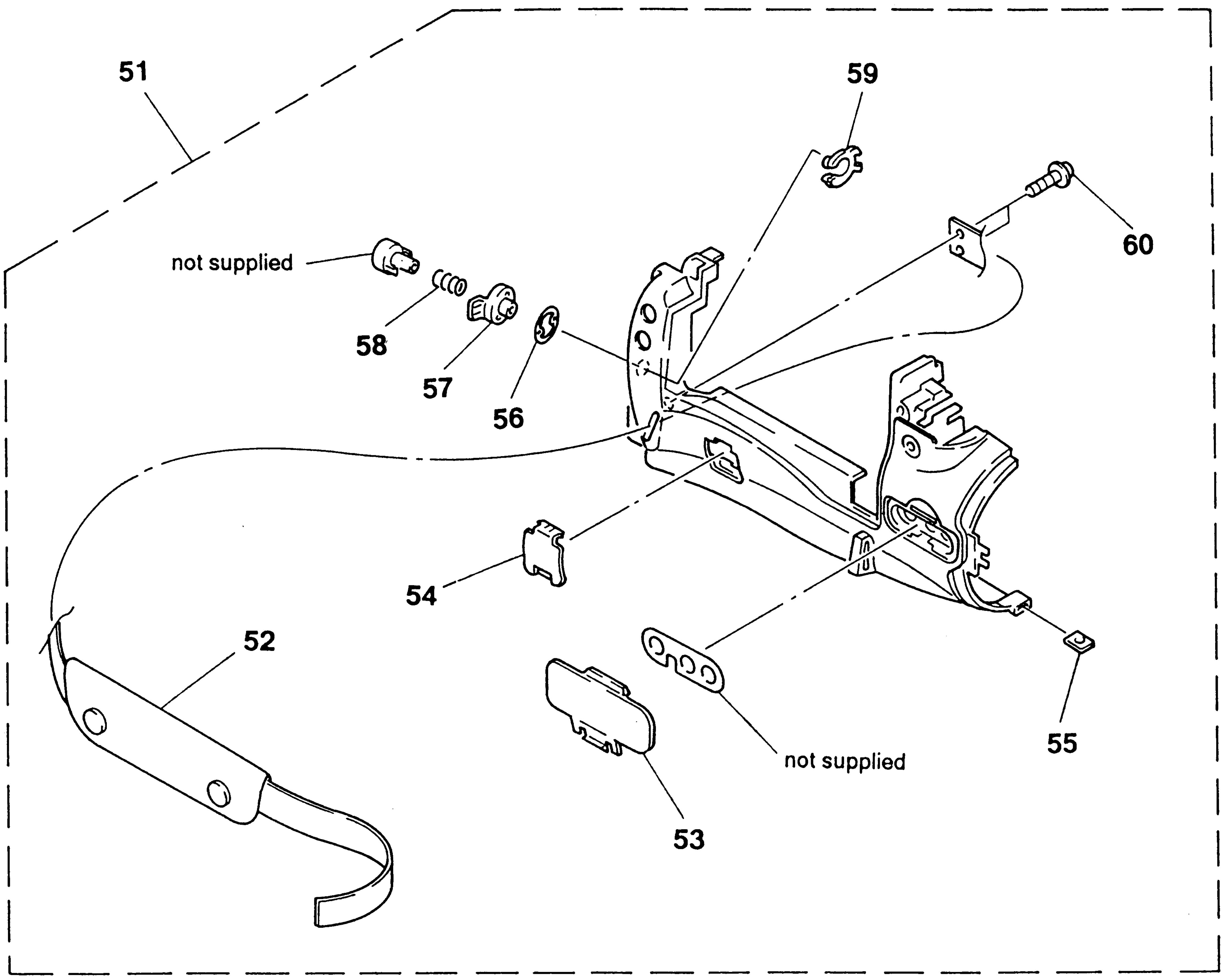
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-1. FRONT CASE BLOCK ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	X-3945-047-1	LID ASSY, CASSETTE	
2	X-3943-993-1	HOLDER (S) ASSY, MICROPHONE	
3	3-948-339-01	SCREW, TAPPING	
* 4	3-958-944-01	PLATE, FIXED, MICROPHONE	
5	A-7082-749-A	CASE BLOCK ASSY, FRONT	
6	3-958-303-41	LABEL, LENS	
7	3-958-329-01	RUBBER, MF	
8	1-467-647-11	SWITCH BLOCK, CONTROL (F-VR)	
9	3-719-381-01	SCREW (M2X4)	
10	1-467-574-71	REMOTE COMMANDER (RMT-708)	
11	3-958-131-01	LID, BATTERY CASE (for RMT-708)	
M002	A-7091-800-A	MICROPHONE UNIT	
M003	A-7091-800-A	MICROPHONE UNIT	

5-1-2. CABINET (L) BLOCK ASSEMBLY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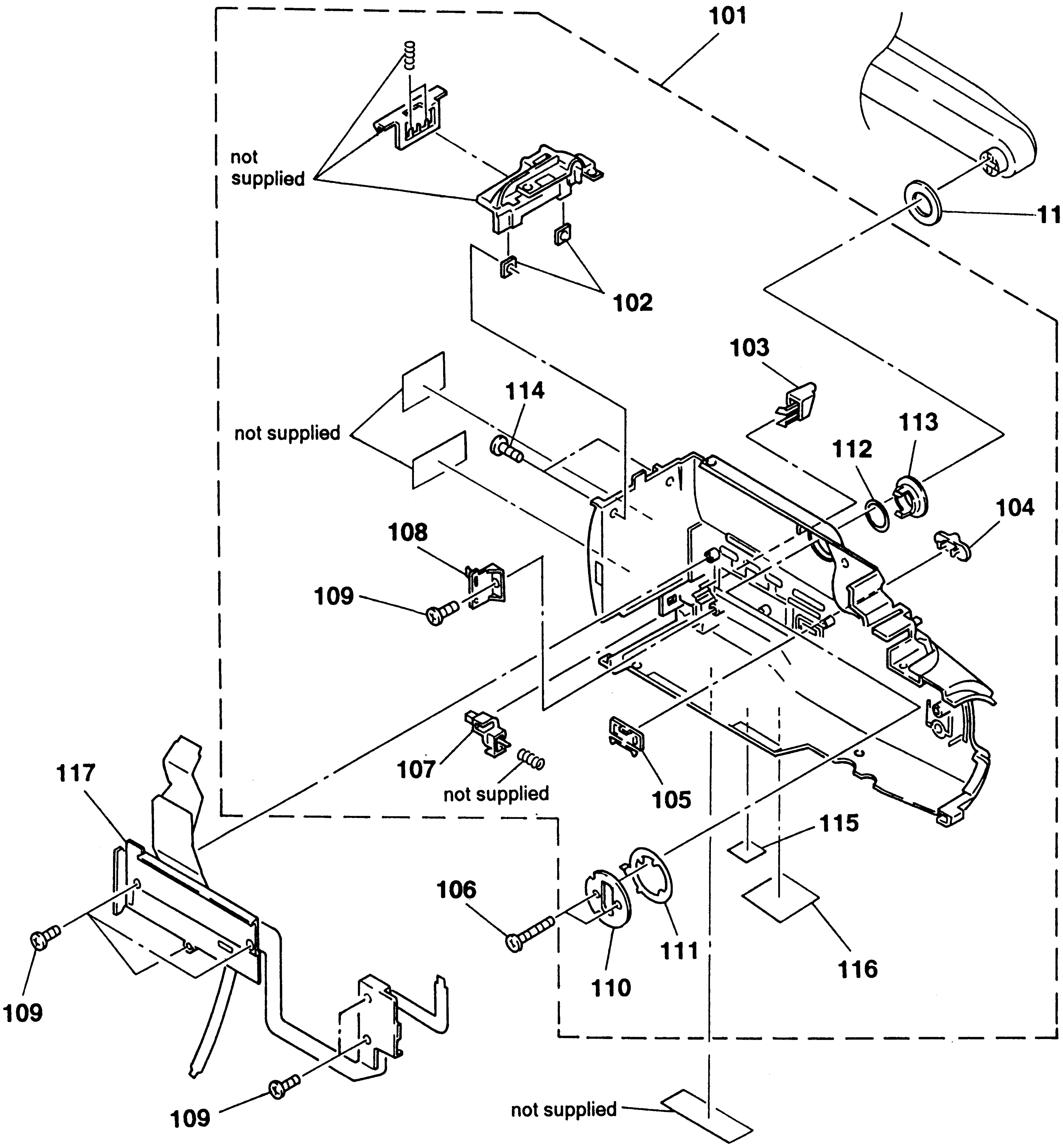
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	A-7082-818-A	CABINET (L) BLOCK ASSY		56	3-736-364-01	SPRING	
52	3-736-807-01	BELT, GRIP		57	3-942-985-01	KNOB, STAND-BY	
53	3-958-335-01	COVER, JACK		58	3-578-221-00	SPRING, COMPRESSION	
54	3-958-334-01	LID, BATTERY CASE, LITHIUM		59	3-942-953-01	HOLDER, STAND-BY KNOB	
55	3-718-233-01	NUT, PLATE		60	3-669-480-21	+ PTPWH 2	

5-1-3. CABINET (R) BLOCK ASSEMBLY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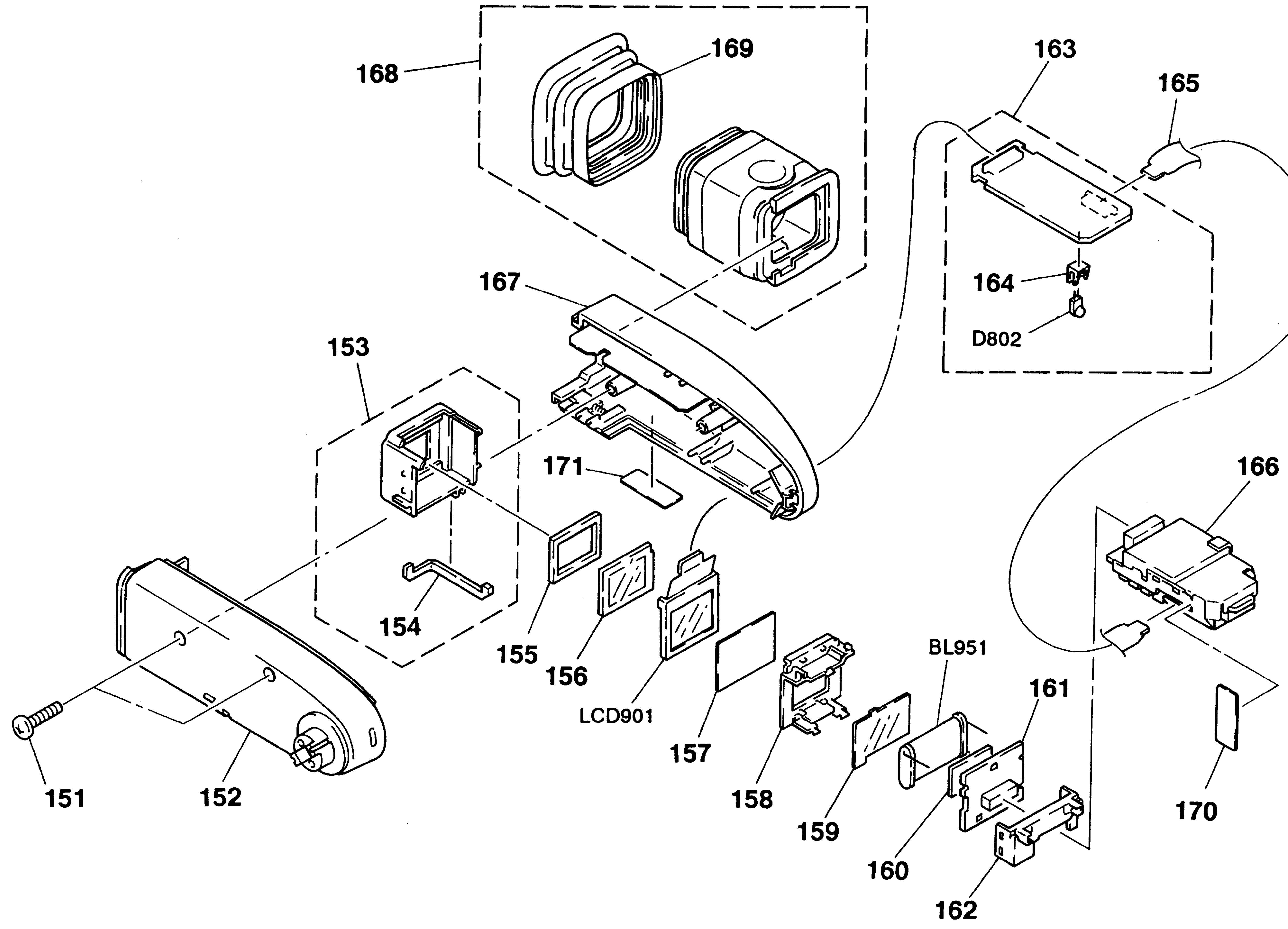
Ref. No.	Part No.	Description	Remark
101	X-3944-916-1	CABINET (R) ASSY (M)	
102	3-718-233-01	NUT, PLATE	
103	3-958-320-01	BUTTON, BATTERY RELEASE	
104	3-958-294-01	BUTTON, ST	
105	3-958-295-01	RETAINER, ST BUTTON	
106	3-740-546-61	SCREW (M2X10.5)	
107	3-958-321-01	CLAW (LOWER), BATTERY LOCK	
108	3-958-322-01	HOLDER, BATTERY LOCK	
109	3-948-339-01	SCREW, TAPPING	
* 110	3-958-297-01	PLATE, LOCK, TILT	
* 111	3-958-296-01	SPRING, PLATE, TILT	
112	3-747-112-01	RING, TILT	
113	3-747-109-01	SLEEVE, EVF	
114	3-719-381-01	SCREW (M2X4)	
115	3-704-256-01	LABEL, CAUTION	
116	3-957-897-01	LABEL, FAROUDJA RECYCLE FCC	
117	1-467-648-11	SWITCH BLOCK, CONTROL (CK)	
118	3-964-404-01	SPACER, TILT	

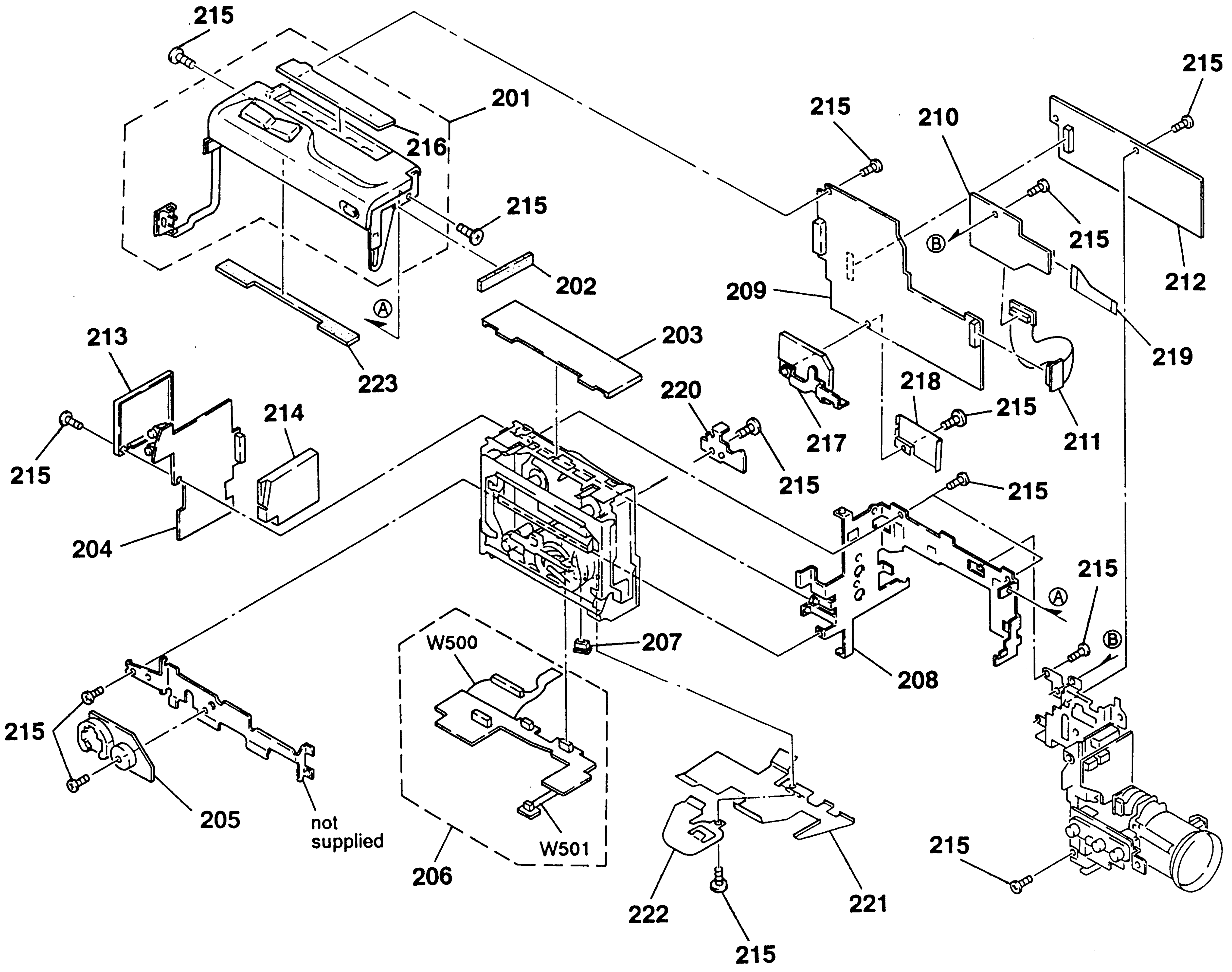
5-1-4. COLOR EVF BLOCK ASSEMBLY



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
151	3-713-790-31	SCREW (M2X8), TAPPING, P3	
152	X-3943-366-1	CABINET (L) ASSY, EVF	
153	X-3943-368-1	HOLDER ASSY, LCD	
* 154	3-947-711-01	GUIDE, LIGHT, INNER TALLY	
* 155	3-955-339-11	SPACER, LCD	
* 156	3-955-340-01	FILTER, LCD	
157	3-958-280-01	ILLUMINATOR, BL	
158	X-3943-227-1	HOLDER ASSY, BL	
* 159	3-955-570-01	PLATE, CONDENSE, BL	
* 160	3-955-573-01	SPACER (E), BL	
* 161	A-7071-913-A	FF-75 BOARD, COMPLETE	
162	3-947-714-11	HOLDER (R), LCD	
* 163	A-7063-779-A	VF-68 BOARD, COMPLETE	
164	3-942-888-01	HOLDER, LED	
165	1-643-806-11	FP-539 FLEXIBLE BOARD	
⚠*166	A-7063-780-A	VF-69 BOARD, COMPLETE	
167	X-3943-367-1	CABINET (R) ASSY, EVF	
168	X-3943-369-1	HOLDER ASSY, FINDER	
169	3-948-162-01	EYE CUP	
170	3-831-441-XX	SPACER, KNOB	
171	3-948-291-01	LABEL (3), EVF	
BL951	1-519-746-61	TUBE, FLUORESCENT (0.7 INCH)	
D802	8-719-984-02	LED BR4371F (TALLY)	
LCD901	8-753-011-00	LCX003BK-1	

5-1-5. MAIN BOARDS ASSEMBLY



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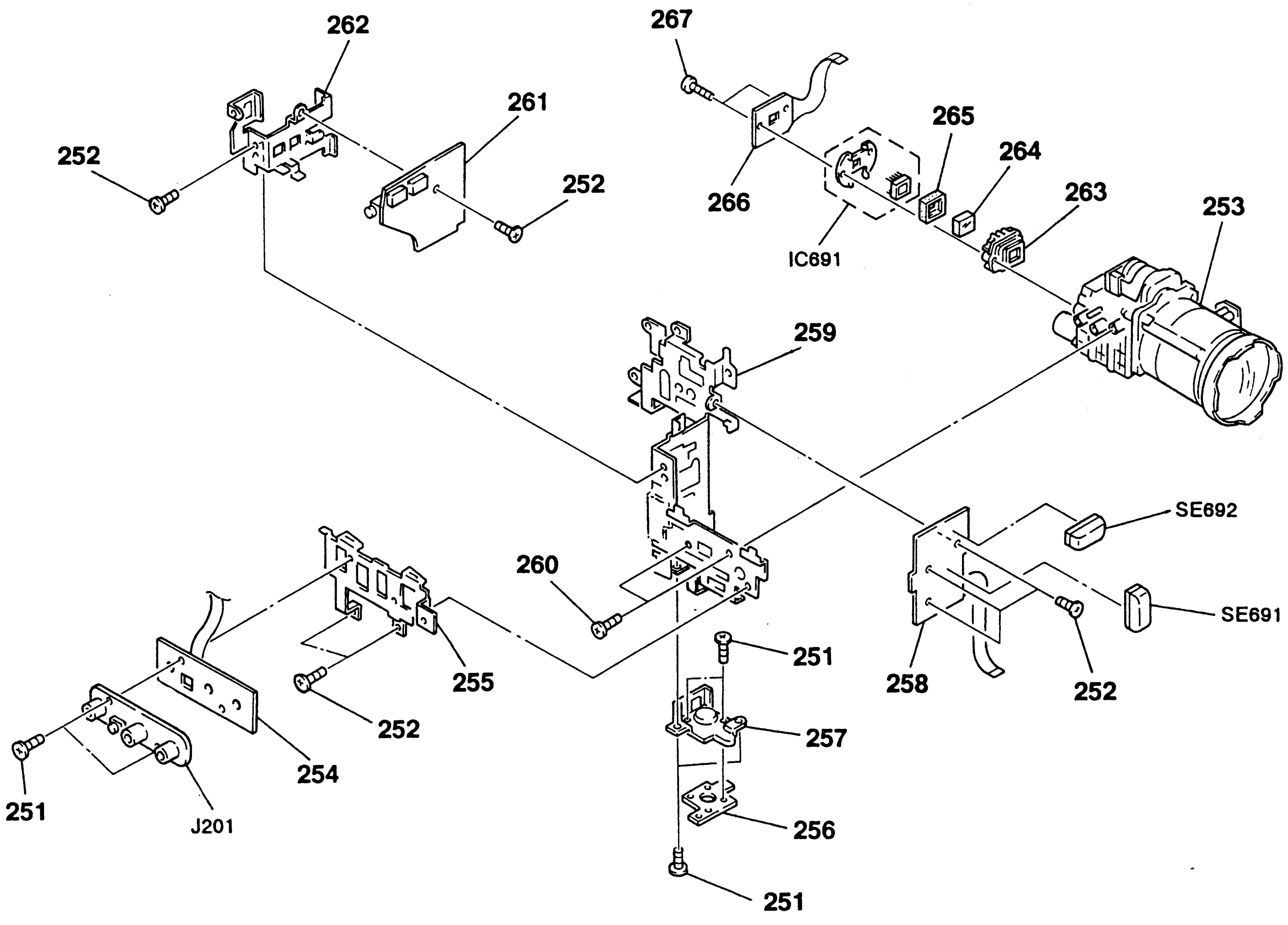
Ref. No.	Part No.	Description	Remark
201	1-467-649-11	SWITCH BLOCK, CONTROL (FK)	
202	3-959-113-01	CUSHION, FK FRAME	
203	3-958-341-01	COVER, LS	
* 204	A-7063-983-A	DD-65 BOARD, COMPLETE	
* 205	1-651-920-11	ZB-2 BOARD	
* 206	A-7072-000-A	SL-38 BOARD, COMPLETE	
207	1-691-471-11	CONNECTOR, TRANSLATION 11P	
* 208	3-958-345-01	FRAME (U)	
* 209	A-7066-356-A	VS-111 BOARD, COMPLETE	
* 210	A-7063-981-A	AU-168 BOARD, COMPLETE	
211	1-652-452-11	FP-166 FLEXIBLE BOARD	
* 212	A-7066-357-A	VC-142 BOARD, COMPLETE	
* 213	3-958-925-01	CASE (MAIN), SHIELD, DD	
* 214	3-958-926-01	CASE (LID), SHIELD, DD	
215	3-713-786-21	SCREW (M2X3)	
216	3-958-720-01	LID	
* 217	X-3943-976-1	SHIELD (MAIN) ASSY, RP	
* 218	3-958-924-01	CASE (LID), SHIELD, RP	
219	1-652-453-11	FP-176 FLEXIBLE BOARD	
* 220	3-958-667-01	FRAME (B)	
* 221	3-958-928-01	PLATE, SHIELD, RP	
222	1-651-891-11	FP-52 FLEXIBLE BOARD	
223	3-958-719-01	CUSHION, FK	
W500	1-651-889-11	FP-48 FLEXIBLE BOARD	
W501	1-642-186-11	FP-437 FLEXIBLE BOARD	

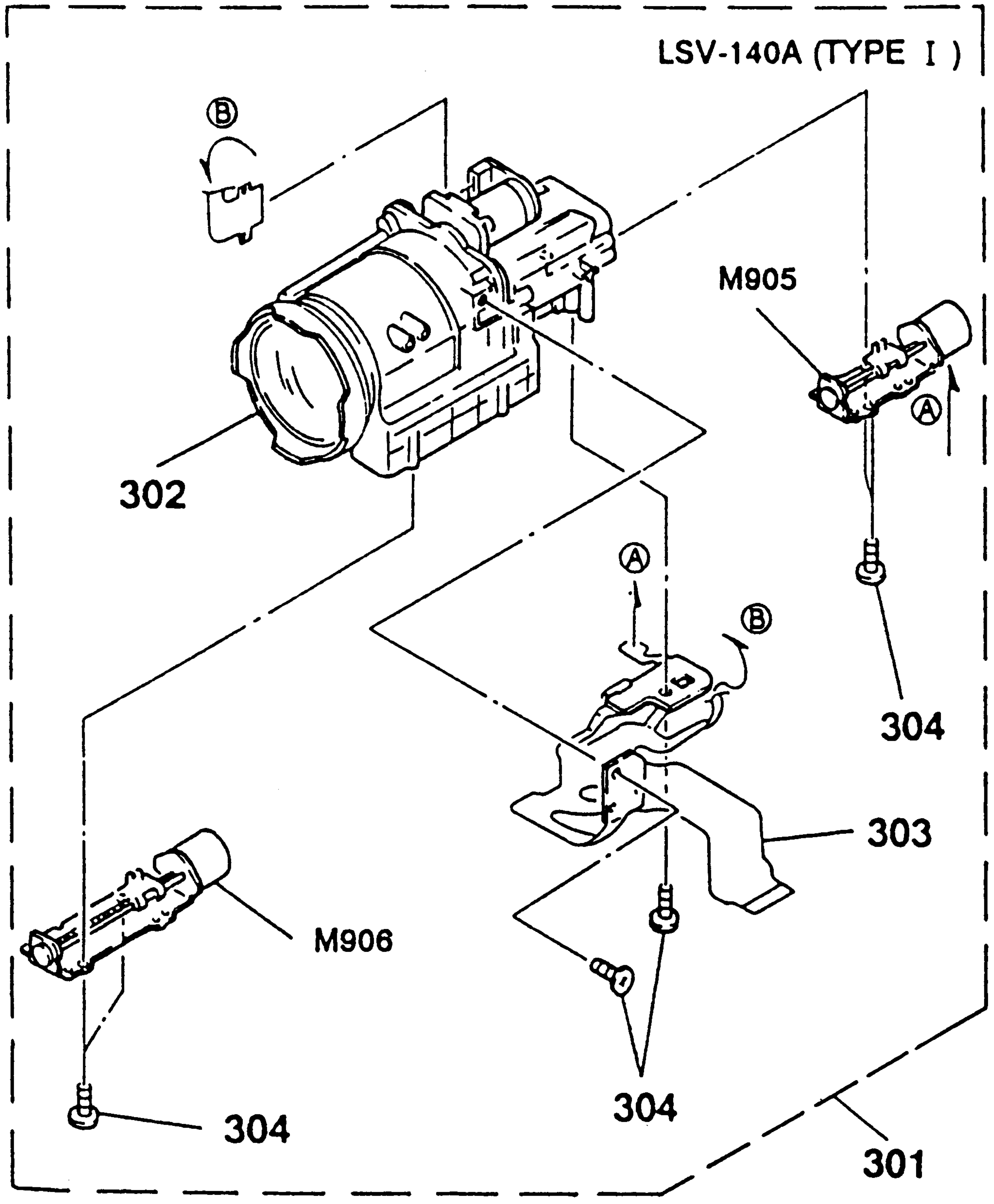
5-1-6. CCD BLOCK ASSEMBLY



Be sure to read "Note on the CCD Imager replacement" on page 4–6 when changing the CCD imager.

Ref. No.	Part No.	Description	Remark
251	3-719-381-01	SCREW (M2X4)	
252	3-713-786-21	SCREW (M2X3)	
253	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
253	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
253	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
254	1-651-904-11	FP-97 FLEXIBLE BOARD	
* 255	3-958-333-01	FRAME (PJ)	
256	3-958-286-01	SHEET METAL, TRIPOD	
257	3-958-310-01	HOLDER, TRIPOD	
258	1-651-890-11	FP-49 FLEXIBLE BOARD	
* 259	X-3944-147-1	FRAME (L) ASSY	
260	3-948-339-01	SCREW, TAPPING	
* 261	A-7063-980-A	MA-198 BOARD, COMPLETE	
* 262	3-958-328-01	FRAME (MA)	
263	3-946-856-01	ADAPTOR (H), CCD FITTING	
264	1-547-735-51	FILTER BLOCK, OPTICAL	
265	3-960-149-01	RUBBER (3), SEAL	
* 266	A-7072-136-A	CD-137 C BOARD, COMPLETE	
267	3-947-268-01	SCREW (P TIGHT)(2), TAPPING, +B	
IC691	A-7030-373-A	CCD BLOCK ASSY (059V SERVICE) (CCD IMAGER)	
J201	1-537-415-11	TERMINAL BOARD	
SE691	1-810-024-31	SENSOR, ANGULAR VELOCITY	
SE692	1-810-024-41	SENSOR, ANGULAR VELOCITY	

5-1-7. ZOOM LENS ASSEMBLIES (LSV-140A) (VCL-5412WA) (VCL-5412WB)


LSV-140A (TYPE Ⅰ)
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M905
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M906
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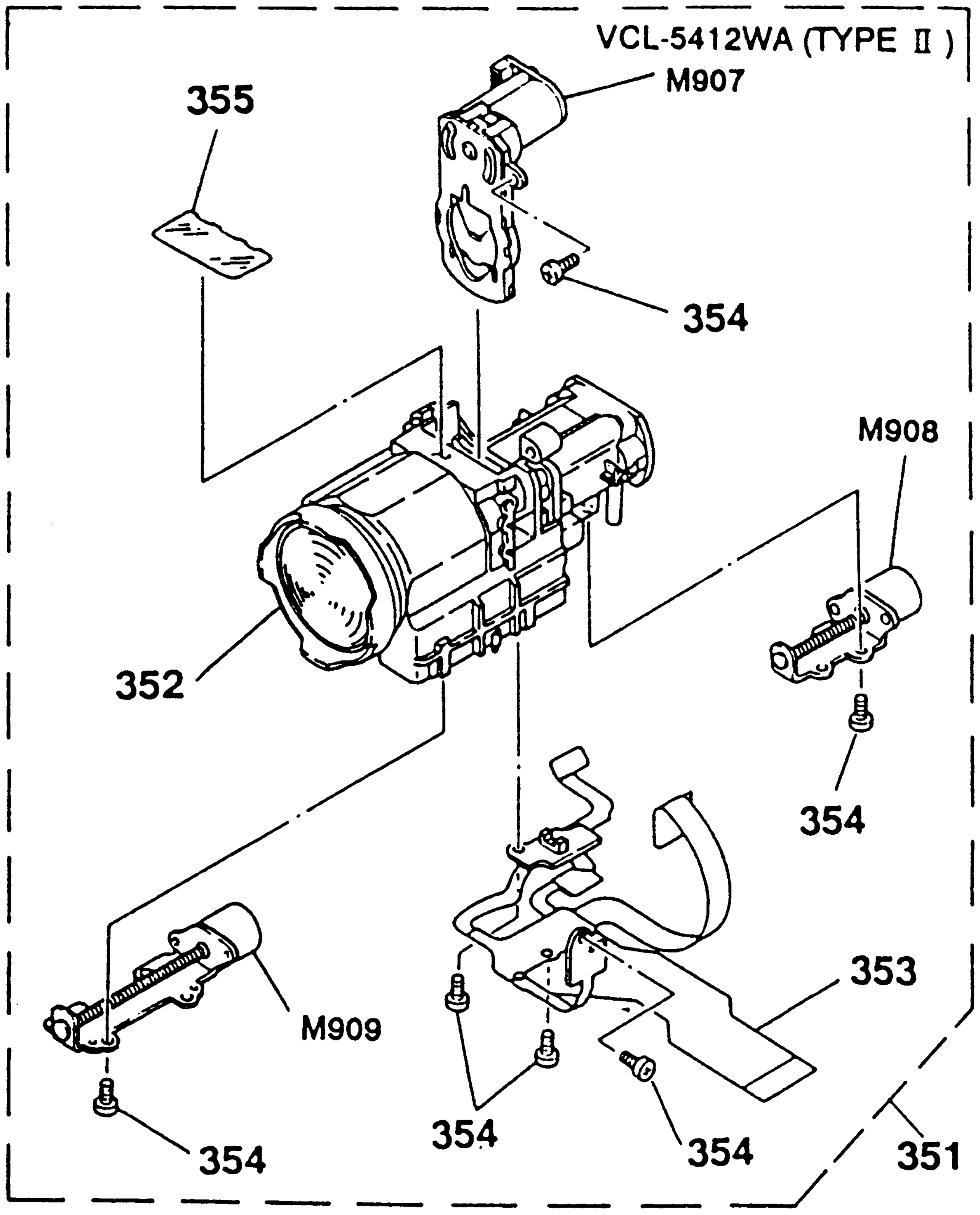
VCL-5412WA (TYPE Ⅱ)
M907
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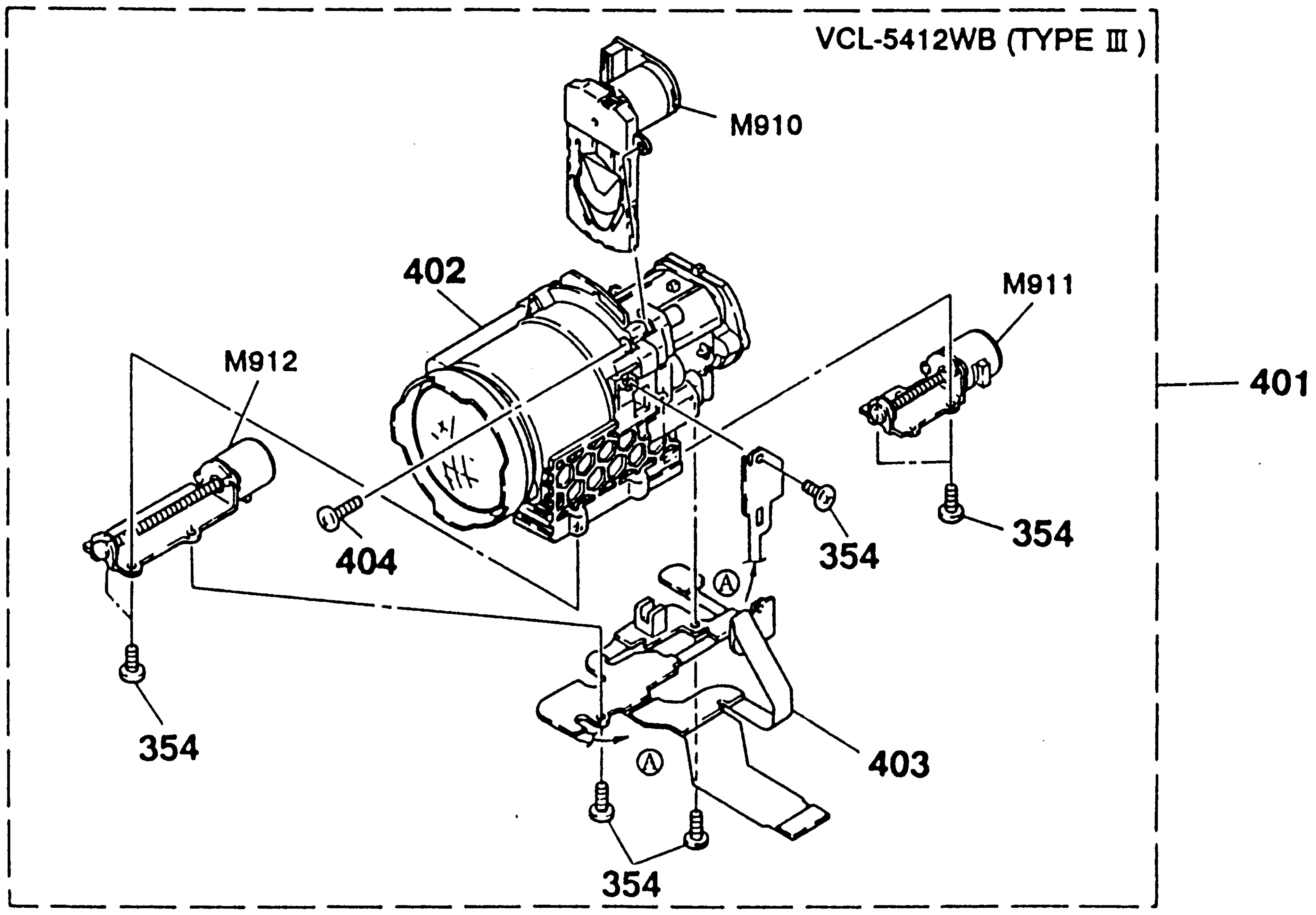
VCL-5412WB (TYPE Ⅲ)
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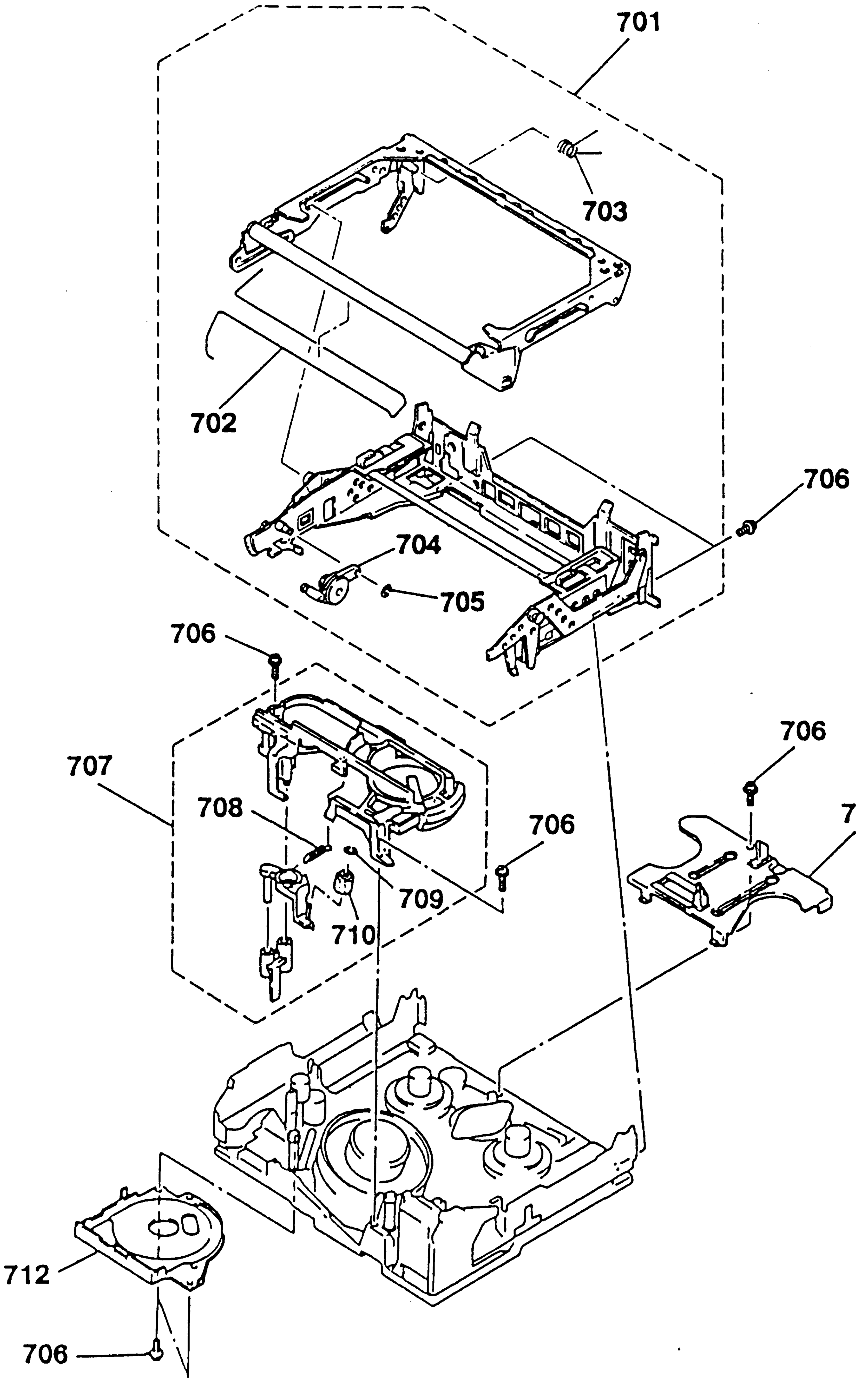
Ref. No.	Part No.	Description	Remark
301	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
302	A-4910-598-A	DEVICE ASSY, LSV-140A (RP)	
303	A-4915-338-A	FLEXIBLE MOUNT	
304	3-713-791-41	SCREW (M1.7X5), TAPPING, P2	
M905	1-698-364-01	MOTOR ASSY, FOCUS	
M906	1-698-363-01	MOTOR ASSY, ZOOM	
351	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
352	3-708-891-01	TUBE, MIRROR ASSY	
353	3-708-890-01	FLEXIBLE, MAIN	
354	3-708-302-01	SCREW (BT3 P1.7X4C)	
355	3-708-886-01	COVER, IG	
M907	3-708-888-01	METER, IG (IRIS)	
M908	3-708-889-01	MOTOR ASSY, FOCUS	
M909	3-708-887-01	MOTOR ASSY, ZOOM	
401	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
402	3-708-900-01	TUBE, MIRROR ASSY	
403	3-708-899-01	PC BOARD ASSY, FLEXIBLE	
404	3-708-617-01	SCREW (BT3 P1.7X7C)	
M910	3-708-898-01	IRIS ASSY	
M911	3-708-897-01	MOTOR ASSY, FOCUS	
M912	3-708-896-01	MOTOR ASSY, ZOOM	

5-1-8. CASSETTE COMPARTMENT ASSEMBLY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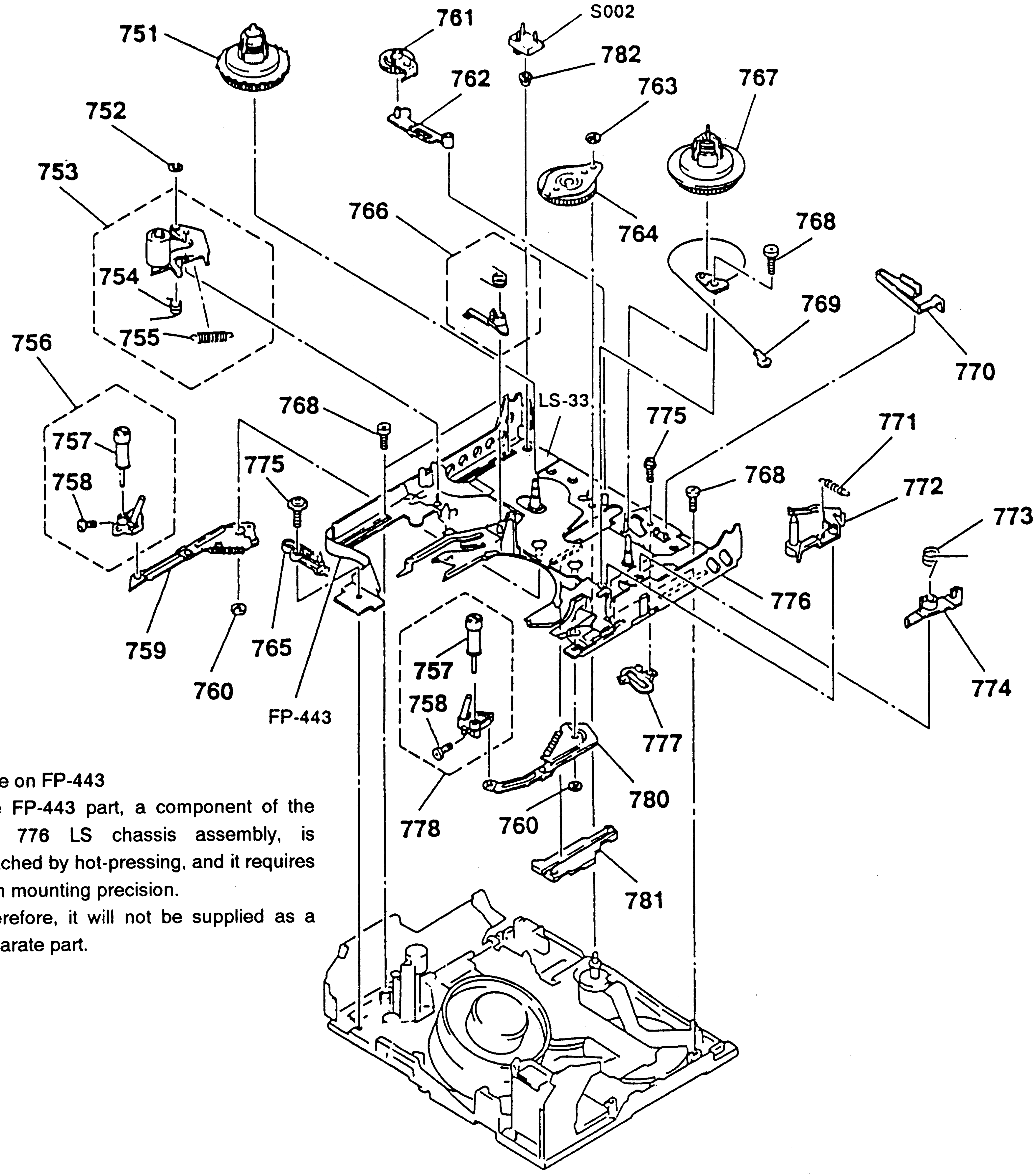
Ref. No.	Part No.	Description	Remark
701	A-7040-312-K	CASSETTE COMPARTMENT BLOCK ASSY	
702	3-945-773-01	BAR, TORSION	
703	3-945-771-01	SPRING, TORSION	
704	X-3941-287-2	DAMPER ASSY	
705	3-315-384-31	WASHER, STOPPER	
706	3-947-503-01	SCREW (M1.4X2.5)	

Ref. No.	Part No.	Description	Remark
707	A-7040-309-A	PROTECT (BASE) BLOCK ASSY	
708	3-945-760-01	SPRING, TENSION	
709	3-321-393-01	WASHER, STOPPER	
710	X-3944-886-1	ROLLER ASSY, HC	
711	X-3941-280-1	RETAINER ASSY, GOOSENECK	
712	3-945-733-01	COVER, CAPSTAN	

5-1-9. LS CHASSIS ASSEMBLY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FP-443
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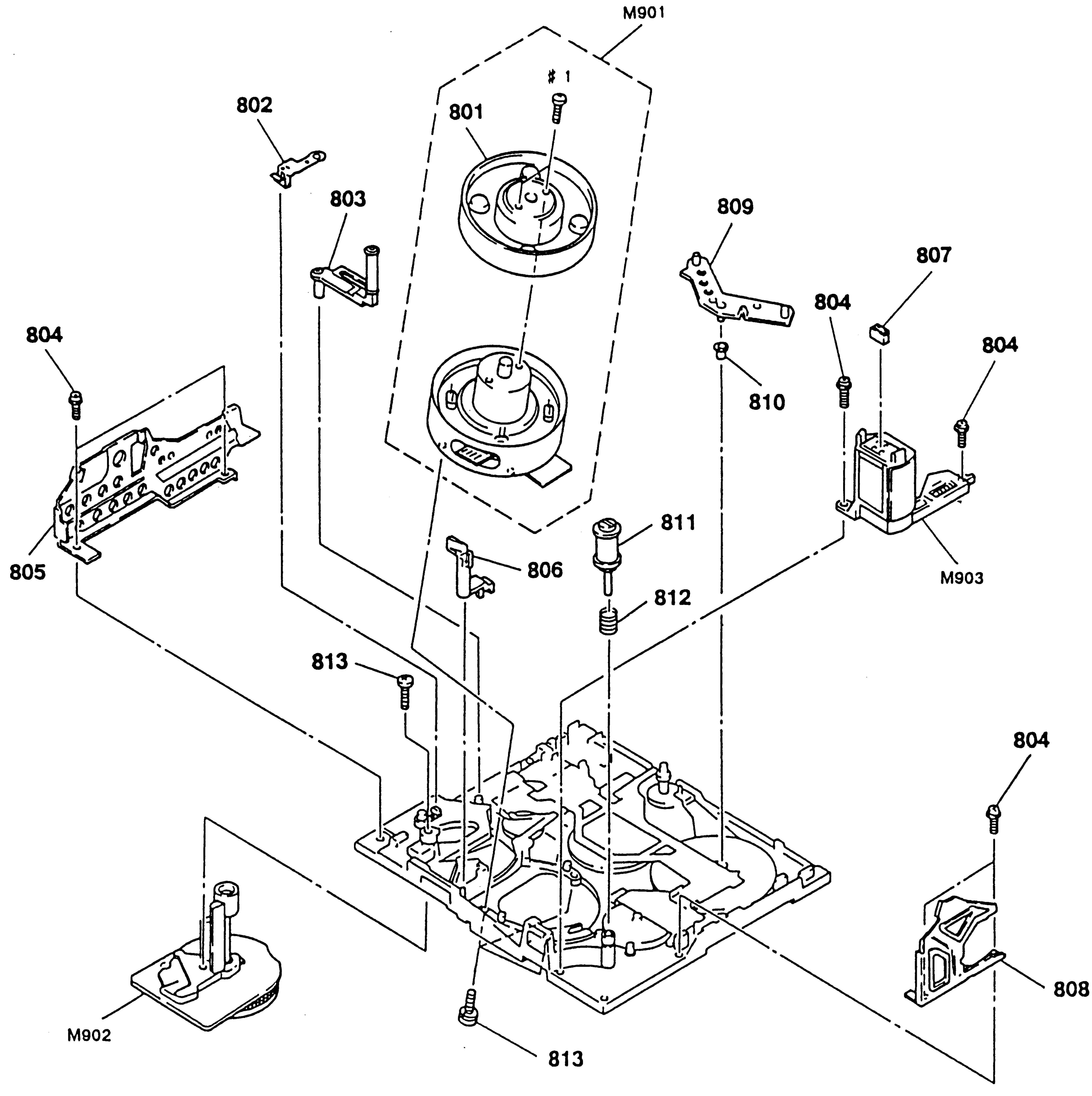
Note on FP-443
The FP-443 part, a component of the No. 776 LS chassis assembly, is attached by hot-pressing, and it requires high mounting precision.
Therefore, it will not be supplied as a separate part.

Ref. No.	Part No.	Description	Remark
751	X-3941-274-1	TABLE ASSY, REEL, T	
752	3-331-007-21	WASHER	
753	X-3941-271-5	ARM ASSY, PINCH	
754	3-945-743-01	SPRING, TORSION	
755	3-945-783-01	SPRING, TENSION	
756	A-7040-307-A	GUIDE (BASE)(T) BLOCK ASSY	
757	X-3941-424-1	ROLLER ASSY, TG6	
758	3-947-504-01	SCREW (M1.2X2)	
759	X-3941-267-1	ARM (T) ASSY, GUIDE	
760	3-669-465-01	WASHER (1.5), STOPPER	
761	X-3941-273-1	SOFT ASSY, T	
762	3-945-753-01	ARM, T SOFT	
763	3-726-829-01	WASHER, STOPPER	
764	X-3941-279-5	GEAR ASSY, GOOSENECK	
765	3-947-644-01	RETAINER, TG5 (BASE)	
766	A-7040-321-A	CLAW BLOCK ASSY, T HARD	
767	X-3944-116-1	TABLE ASSY, S REEL	
768	3-945-756-01	SCREW (M1.4X3)	
769	X-3941-277-1	STRING BLOCK ASSY	
770	3-945-801-01	BRAKE, S SOFT	
771	3-954-327-01	SPRING, TENSION	
772	X-3941-276-1	TG1 ASSY	
773	3-945-752-01	SPRING, TORSION	
774	3-945-799-01	BRAKE, S HARD	
775	3-947-503-01	SCREW (M1.4X2.5)	
776	X-3943-307-1	CHASSIS ASSY, LS	
777	3-945-784-01	PLATE, CAM, LS	
778	A-7040-323-A	GUIDE (BASE)(S) BLOCK ASSY	
780	X-3941-266-1	ARM (S) ASSY, GUIDE	
781	3-945-837-01	SLIDER, GL	
782	3-949-881-01	SLEEVE	
S002	1-572-987-11	SWITCH, PUSH (3 KEY)	(REC PROOF, ME/MP, MP/MP-HG)

5-1-10. MECHANISM CHASSIS ASSEMBLY (1)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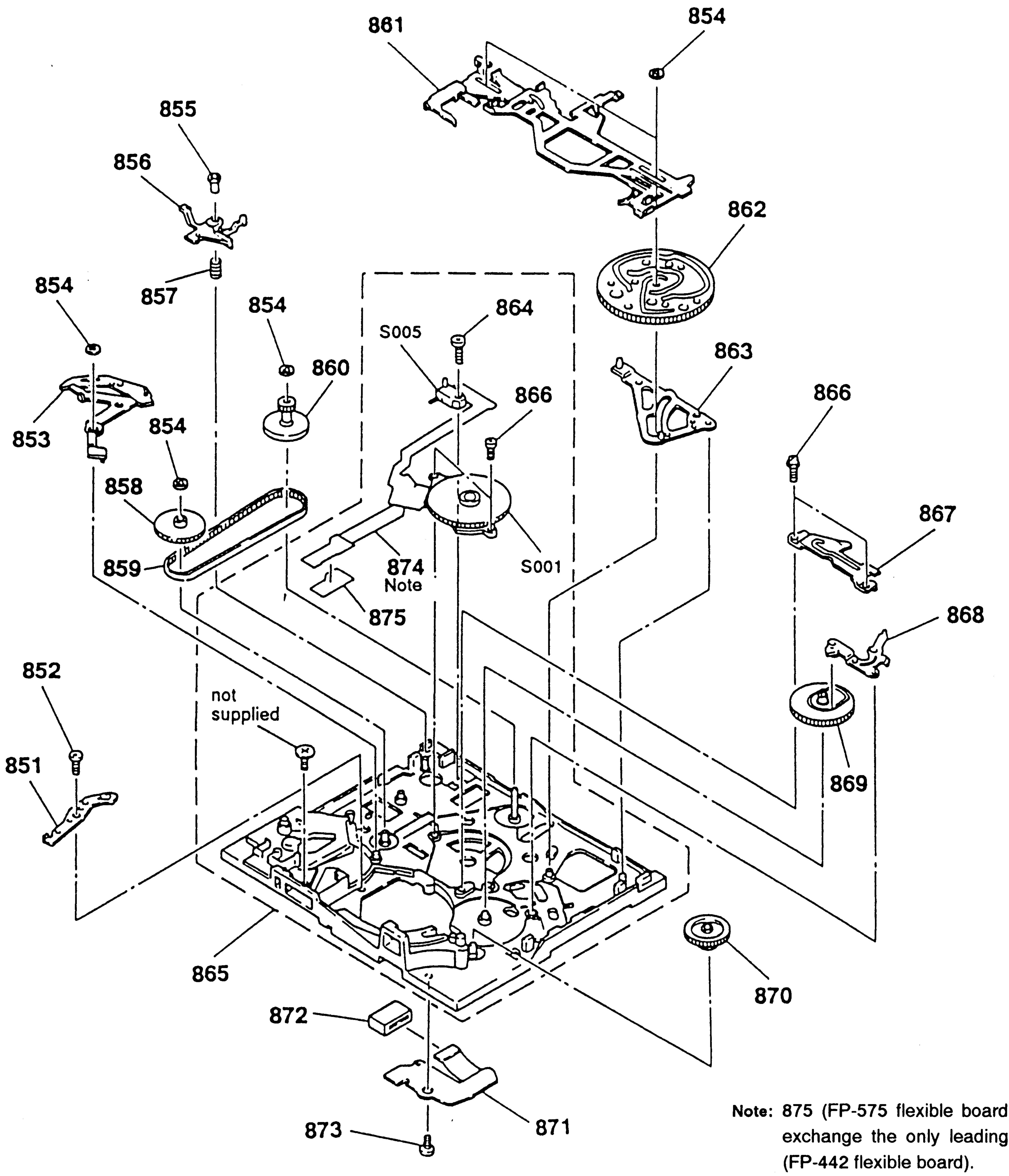
Ref. No.	Part No.	Description	Remark
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
802	3-945-822-01	SPRING, LEAF, TG7 ARM	
803	A-7040-305-A	ARM BLOCK ASSY, TG7	
804	3-947-503-01	SCREW (M1.4X2.5)	
805	X-3941-255-1	PLATE (T) ASSY, SIDE	
806	3-945-735-01	ARM, HC CONVERSION	
807	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
808	3-945-691-01	PLATE (S), SIDE	
809	3-945-701-01	ARM, LS	
810	3-945-702-01	ROLLER, LS	
811	X-3941-262-1	ROLLER ASSY, TG2	
812	3-956-651-01	SPRING, COMPRESSION	
813	3-686-493-01	SCREW (M2X5), P1	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-12	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	

5-1-11. MECHANISM CHASSIS ASSEMBLY (2)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Note: 875 (FP-575 flexible board) is part that exchange the only leading part of 874 (FP-442 flexible board).

Ref. No.	Part No.	Description	Remark
851	3-945-734-01	ARM, HC DRIVING	
852	3-728-103-11	SCREW (M1.4X1.6), SPECIAL HEAD	
853	X-3941-259-1	ARM ASSY, PINCH PRESS	
854	3-726-829-01	WASHER, STOPPER	
855	3-945-730-01	SLEEVE, EJECT	
856	3-945-706-01	LEVER, EJECT	
857	3-945-729-01	SPRING, COMPRESSION	
858	X-3941-256-1	GEAR ASSY, CHANGE	
859	3-944-539-01	BELT, RELAY	
860	3-945-695-01	PULLEY, RELAY	
861	X-3941-260-1	SLIDER ASSY, M	
862	3-945-696-02	CAM	
863	X-3941-258-3	ARM ASSY, GL	
864	3-713-786-71	SCREW (M2X5)	
865	A-7040-303-A	CHASSIS ASSY, MECHANICAL	
866	3-947-503-01	SCREW (M1.4X2.5)	
867	3-945-722-01	RETAINER, GEAR	
868	X-3941-257-1	ARM ASSY, FF	
869	3-945-697-01	GEAR (B), L	
870	3-945-700-01	GEAR (A), L	
871	1-641-643-12	FP-444 FLEXIBLE BOARD	
872	1-691-254-13	CONNECTOR, TRANSLATION 10P	
873	3-945-756-01	SCREW (M1.4X3)	
874	1-641-639-13	FP-442 FLEXIBLE BOARD	
875	1-645-271-11	FP-575 FLEXIBLE BOARD	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S005	1-570-771-21	SWITCH (C DOWN)	

5-2. ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

Ref.No.	Part No.	Description	Remark
	A-7063-981-A	AU-168 BOARD, COMPLETE *********************** (Ref.No. 20,000 Series)	
		< CAPACITOR >	
C1302	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1303	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1304	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1305	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1306	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1307	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1308	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1309	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1310	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1311	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1312	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C1313	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C1314	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C1315	1-126-209-11	ELECT 100uF 20% 4V	
C1316	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C1318	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1319	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C1321	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1323	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1326	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1327	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1328	1-107-682-11	CERAMIC CHIP 1uF 10% 16V	
C1329	1-107-682-11	CERAMIC CHIP 1uF 10% 16V	
C1330	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C1331	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C1332	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1333	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C1334	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1335	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1336	1-135-148-21	TANTAL. CHIP 1.5uF 20% 10V	
C1337	1-135-148-21	TANTAL. CHIP 1.5uF 20% 10V	
C1338	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1339	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1340	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1341	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C1343	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1344	1-164-346-11	CERAMIC CHIP 1uF 16V	
C1345	1-162-967-11	CERAMIC CHIP 0.0033uF 10% 50V	
C1346	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1347	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1348	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1349	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1350	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1352	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1353	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1355	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C1356	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C1357	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C1358	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1359	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1360	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1361	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1362	1-162-969-11	CERAMIC CHIP 0.0068uF 10% 25V	
C1363	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C1364	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
		< CONNECTOR >	
CN1301	1-691-490-21	CONNECTOR, FFC/FPC 11P	
* CN1302	1-691-933-11	CONNECTOR, BOARD TO BOARD 34P	
		< DIODE >	
D1302	1-164-161-11	CERAMIC CHIP 0.0022uF 10% 100V	
		< FILTER >	
FL402	1-236-838-21	FILTER, BAND PASS	
FL1302	1-236-837-21	FILTER, BAND PASS	
		< IC >	
IC402	8-759-234-77	IC TC4S66F	
IC1301	8-759-159-94	IC LA7491W-TBM	
		< TRANSISTOR >	
Q1301	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1302	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1303	8-729-403-35	TRANSISTOR UN5113	
Q1305	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1306	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1311	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1312	8-729-402-42	TRANSISTOR UN5213	
Q1313	8-729-403-35	TRANSISTOR UN5113	

Ref.No.	Part No.	Description	Remark
Q1315	8-729-402-42	TRANSISTOR UN5213	
Q1316	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1317	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1318	8-729-402-81	TRANSISTOR XN4501	
Q1319	8-729-402-81	TRANSISTOR XN4501	
Q1320	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q1321	8-729-420-12	TRANSISTOR XN4213	
Q1322	8-729-420-12	TRANSISTOR XN4213	
		< RESISTOR >	
R1301	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R1302	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1303	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R1304	1-216-810-11	METAL CHIP 120 5% 1/16W	
R1305	1-216-810-11	METAL CHIP 120 5% 1/16W	
R1306	1-216-817-11	METAL CHIP 470 5% 1/16W	
R1307	1-216-817-11	METAL CHIP 470 5% 1/16W	
R1308	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1309	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1312	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R1316	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R1317	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1318	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1321	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R1322	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R1323	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R1324	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1325	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1330	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1331	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1334	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R1335	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R1336	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1337	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R1338	1-216-863-11	METAL GLAZE 3.3M 5% 1/16W	
R1340	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1341	1-216-863-11	METAL GLAZE 3.3M 5% 1/16W	
R1342	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1348	1-216-847-11	METAL CHIP 150K 5% 1/16W	
R1349	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R1350	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
R1351	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1352	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1353	1-216-817-11	METAL CHIP 470 5% 1/16W	
R1354	1-216-817-11	METAL CHIP 470 5% 1/16W	
R1355	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1356	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R1357	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R1358	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R1359	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	

Ref.No.	Part No.	Description	Remark
R1360	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R1361	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R1362	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R1363	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R1364	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	
R1365	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1366	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1367	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1368	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1369	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R1370	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R1371	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R1372	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R1373	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1375	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R1376	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R1378	1-216-817-11	METAL CHIP 470 5% 1/16W	
R1381	1-216-864-11	METAL CHIP 0 5% 1/16W	

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A-7072-136-A CD-137 C BOARD, COMPLETE
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(Ref.No. 1,000 Series)

Ref.No.	Part No.	Description	Remark
		< CAPACITOR >	
C691	1-135-214-21	TANTAL. CHIP 4.7uF 20% 20V	
C692	1-135-210-11	TANTALUM CHIP 4.7uF 20% 10V	
C694	1-164-346-11	CERAMIC CHIP 1uF 16V	
C695	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
C696	1-104-908-11	TANTAL. CHIP 47uF 20% 4V	
		< IC >	
IC691	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE)(CCD IMAGER)	
		< COIL >	
L691	1-412-963-11	INDUCTOR 100uH	
		< TRANSISTOR >	
Q691	8-729-232-86	TRANSISTOR 2SK1875-BL/V	
Q692	8-729-117-73	TRANSISTOR 2SC4178-F14	
		< RESISTOR >	
R692	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R693	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R694	1-216-047-00	METAL CHIP 820 5% 1/10W	
R695	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R696	1-216-809-11	METAL CHIP 100 5% 1/16W	
R697	1-216-073-00	METAL CHIP 10K 5% 1/10W	

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Be sure to read "Note on the CCD Imager replacement" on page 4-6 when changing the CCD imager.

Ref.No.	Part No.	Description	Remark
	A-7063-983-A	DD-65 BOARD, COMPLETE **********************	
		(Ref.No. 6,000 Series)	
		< CAPACITOR >	
C901	1-164-492-11	CERAMIC CHIP 0.15uF 10% 16V	
C902	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C903	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C904	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C906	1-164-245-11	CERAMIC CHIP 0.015uF 10% 25V	
C907	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C908	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C909	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C910	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C911	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C912	1-128-530-11	ELECT CHIP 33uF 20% 10V	
C913	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C914	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C915	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C916	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C917	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C918	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C920	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C921	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C923	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C924	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C925	1-164-506-11	CERAMIC CHIP 4.7uF 16V	
C926	1-164-337-11	CERAMIC CHIP 2.2uF 16V	
C927	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C928	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C929	1-135-216-11	TANTALUM CHIP 10uF 20% 10V	
C930	1-107-418-11	ELECT CHIP 10uF 20% 35V	
C931	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C932	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C934	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C935	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C936	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C937	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C938	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C939	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C940	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C941	1-163-019-00	CERAMIC CHIP 0.0068uF 10% 50V	
C942	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C943	1-163-019-00	CERAMIC CHIP 0.0068uF 10% 50V	
C944	1-164-161-11	CERAMIC CHIP 0.0022uF 10% 100V	
C945	1-128-530-11	ELECT CHIP 33uF 20% 10V	
C950	1-128-004-11	ELECT CHIP 10uF 20% 16V	
		< CONNECTOR >	
CN901	1-695-324-11	CONNECTOR, BOARD TO BOARD 42P	

Ref.No.	Part No.	Description	Remark
		< DIODE >	
D901	8-719-027-77	DIODE MA796-TX	
D909	8-719-404-49	DIODE MA111	
D910	8-719-404-49	DIODE MA111	
		< FUSE >	
⚠F450	1-576-213-11	FUSE, CHIP (1.6A 125V)	
⚠F451	1-576-213-11	FUSE, CHIP (1.6A 125V)	
⚠F452	1-576-213-11	FUSE, CHIP (1.6A 125V)	
		< IC >	
IC901	8-759-295-31	IC MB3799-03PFV-G-BND-ER	
		< JACK >	
J901	1-537-281-41	TERMINAL BOARD (BATTERY TERMINAL)	
J902	1-565-276-21	JACK, ULTRA SMALL 1P (LANC)	
J903	1-569-809-11	JACK (SMALL TYPE)(∩)	
		< COIL >	
L901	1-424-653-11	COIL, CHOKE 10uH	
L902	1-424-653-11	COIL, CHOKE 10uH	
L903	1-424-653-11	COIL, CHOKE 10uH	
L904	1-409-556-11	COIL, CHOKE 47uH	
L905	1-424-674-11	COIL, CHOKE 22uH	
L906	1-409-556-11	COIL, CHOKE 47uH	
L907	1-424-674-11	COIL, CHOKE 22uH	
L908	1-424-674-11	COIL, CHOKE 22uH	
L909	1-412-056-11	INDUCTOR CHIP 4.7uH	
L910	1-412-056-11	INDUCTOR CHIP 4.7uH	
L911	1-412-056-11	INDUCTOR CHIP 4.7uH	
L912	1-412-056-11	INDUCTOR CHIP 4.7uH	
L913	1-412-056-11	INDUCTOR CHIP 4.7uH	
L914	1-412-064-11	INDUCTOR CHIP 100uH	
L915	1-412-064-11	INDUCTOR CHIP 100uH	
L916	1-412-056-11	INDUCTOR CHIP 4.7uH	
L917	1-412-056-11	INDUCTOR CHIP 4.7uH	
		< TRANSISTOR >	
Q901	8-729-420-12	TRANSISTOR XN4213	
Q902	8-729-804-41	TRANSISTOR 2SB1122-S	
Q903	8-729-823-82	TRANSISTOR FP101	
Q904	8-729-823-84	TRANSISTOR FP102	
Q905	8-729-823-82	TRANSISTOR FP101	
Q906	8-729-823-82	TRANSISTOR FP101	
Q907	8-729-823-82	TRANSISTOR FP101	
Q909	8-729-805-25	TRANSISTOR 2SB1121	
Q914	8-729-402-42	TRANSISTOR UN5213	
Q915	8-729-402-42	TRANSISTOR UN5213	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

< RESISTOR >

Ref.No.	Part No.	Description	Remark
R901	1-218-872-11	METAL CHIP 11K 0.50% 1/16W	
R902	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R903	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R904	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R905	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R906	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R907	1-216-035-00	METAL CHIP 270 5% 1/10W	
R908	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R909	1-216-031-00	METAL CHIP 180 5% 1/10W	
R910	1-216-029-00	METAL CHIP 150 5% 1/10W	
R911	1-216-029-00	METAL CHIP 150 5% 1/10W	
R912	1-216-029-00	METAL CHIP 150 5% 1/10W	
R913	1-216-041-00	METAL CHIP 470 5% 1/10W	
R915	1-216-864-11	METAL CHIP 0 5% 1/16W	
R918	1-216-819-11	METAL CHIP 680 5% 1/16W	
R919	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R920	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R921	1-412-052-21	INDUCTOR CHIP 1UH	
R922	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R923	1-412-052-21	INDUCTOR CHIP 1UH	
R924	1-412-979-21	INDUCTOR 1UH	
R925	1-216-864-11	METAL CHIP 0 5% 1/16W	
R927	1-216-864-11	METAL CHIP 0 5% 1/16W	
R928	1-216-852-11	METAL CHIP 390K 5% 1/16W	
R931	1-216-864-11	METAL CHIP 0 5% 1/16W	
R932	1-412-979-21	INDUCTOR 1UH	
R933	1-412-979-21	INDUCTOR 1UH	
R936	1-412-979-21	INDUCTOR 1UH	
R937	1-216-864-11	METAL CHIP 0 5% 1/16W	
R938	1-216-864-11	METAL CHIP 0 5% 1/16W	
R940	1-216-864-11	METAL CHIP 0 5% 1/16W	
R941	1-218-849-11	METAL CHIP 1.2K 0.50% 1/16W	
R942	1-216-864-11	METAL CHIP 0 5% 1/16W	
R944	1-216-864-11	METAL CHIP 0 5% 1/16W	
R945	1-218-847-11	METAL CHIP 1K 0.50% 1/16W	

< TRANSFORMER >

Ref.No.	Part No.	Description	Remark
T901	1-426-938-11	TRANSFORMER, DC/DC CONVERTER	

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A-7071-913-A FF-75 BOARD, COMPLETE

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(Ref.No. 5,000 Series)

< FLUORESCENT TUBE >

Ref.No.	Part No.	Description	Remark
⚠BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH)	

< CONNECTOR >

Ref.No.	Part No.	Description	Remark
CN954	1-580-248-31	CONNECTOR, BOARD TO BOARD 20P	

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1-651-890-11 FP-49 FLEXIBLE BOARD

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(Ref.No. 1,000 Series)

< SENSOR >

Ref.No.	Part No.	Description	Remark
SE691	1-810-024-31	SENSOR, ANGULAR VELOCITY	
SE692	1-810-024-41	SENSOR, ANGULAR VELOCITY	

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LS-33 BOARD, COMPLETE

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(Ref.No. 7,000 Series)

< DIODE >

Ref.No.	Part No.	Description	Remark
D001	8-719-989-52	DIODE GL4600S	

< HALL ELEMENT >

Ref.No.	Part No.	Description	Remark
H001	8-719-987-62	DIODE LT140SAZ	
H002	8-719-987-62	DIODE LT140SAZ	

< TRANSISTOR >

Ref.No.	Part No.	Description	Remark
Q001	8-729-012-46	TRANSISTOR PT4600FS	
Q002	8-729-012-46	TRANSISTOR PT4600FS	

< RESISTOR >

Ref.No.	Part No.	Description	Remark
R003	1-216-033-00	METAL CHIP 220 5% 1/10W	
R004	1-216-033-00	METAL CHIP 220 5% 1/10W	
R010	1-216-033-00	METAL CHIP 220 5% 1/10W	
R011	1-216-033-00	METAL CHIP 220 5% 1/10W	

< SWITCH >

Ref.No.	Part No.	Description	Remark
S002	1-572-987-11	SWITCH, PUSH (3 KEY)(TAPE SELECT)	

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A-7063-980-A MA-198 BOARD, COMPLETE

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(Ref.No. 4,000 Series)

< CAPACITOR >

Ref.No.	Part No.	Description	Remark
C001	1-164-343-11	CERAMIC CHIP 0.056uF 10% 25V	
C003	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C005	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C006	1-163-037-11	CERAMIC CHIP 0.022uF 10% 25V	
C007	1-164-360-11	CERAMIC CHIP 0.1uF 16V	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
C008	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C009	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C010	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C011	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C012	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C013	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C014	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C015	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C019	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C020	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C021	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C022	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C023	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C024	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C025	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C026	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C027	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C030	1-164-343-11	CERAMIC CHIP	0.056uF	10%	25V
		< CONNECTOR >			
* CN001	1-764-519-11	CONNECTOR, FFC/FPC (ZIF) 10P			
* CN002	1-580-055-21	PIN, CONNECTOR 2P			
* CN003	1-580-055-21	PIN, CONNECTOR 2P			
		< DIODE >			
D001	8-719-404-49	DIODE MA111			
D002	8-719-404-49	DIODE MA111			
		< IC >			
IC001	8-759-084-53	IC CXA1618AN-E2			
IC002	8-749-923-29	IC RS-20E-T			
		< JACK >			
J001	1-691-737-11	JACK (SMALL TYPE)(MIC)			
		< COIL >			
L001	1-412-939-11	INDUCTOR 1uH			
L002	1-412-939-11	INDUCTOR 1uH			
L003	1-412-939-11	INDUCTOR 1uH			
		< TRANSISTOR >			
Q001	8-729-230-63	TRANSISTOR 2SC4116-YG			
Q003	8-729-402-42	TRANSISTOR UN5213			
		< RESISTOR >			
R003	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R004	1-216-833-11	METAL CHIP	10K	5%	1/16W
R005	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R006	1-216-864-11	METAL CHIP	0	5%	1/16W
R007	1-216-836-11	METAL CHIP	18K	5%	1/16W
R008	1-216-834-11	METAL CHIP	12K	5%	1/16W
R009	1-216-835-11	METAL CHIP	15K	5%	1/16W
R010	1-216-833-11	METAL CHIP	10K	5%	1/16W
R011	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R012	1-216-839-11	METAL CHIP	33K	5%	1/16W
R013	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R014	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R015	1-216-839-11	METAL CHIP	33K	5%	1/16W
R016	1-216-833-11	METAL CHIP	10K	5%	1/16W
R017	1-216-835-11	METAL CHIP	15K	5%	1/16W
R018	1-216-836-11	METAL CHIP	18K	5%	1/16W
R019	1-216-834-11	METAL CHIP	12K	5%	1/16W
R020	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R022	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R023	1-216-833-11	METAL CHIP	10K	5%	1/16W
R024	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R025	1-216-864-11	METAL CHIP	0	5%	1/16W
R036	1-216-864-11	METAL CHIP	0	5%	1/16W
R037	1-216-839-11	METAL CHIP	33K	5%	1/16W
R039	1-216-824-11	METAL CHIP	1.8K	5%	1/16W

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A-7072-000-A SL-38 BOARD, COMPLETE
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(Ref.No. 3,000 Series)

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C543	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C544	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C545	1-135-211-11	TANTAL. CHIP	6.8uF	20%	6.3V
C546	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C547	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C551	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C553	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C554	1-135-215-21	TANTAL. CHIP	6.8uF	20%	16V
C555	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C556	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C557	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C558	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
		< CONNECTOR >			
CN500	1-691-473-21	CONNECTOR, FFC/FPC 7P			
CN501	1-691-472-21	CONNECTOR, FFC/FPC 6P			
CN502	1-691-482-21	CONNECTOR, FFC/FPC 15P			
		< IC >			
IC507	8-759-165-47	IC MPC1780VFUEB			
		< COIL >			
L505	1-414-078-11	INDUCTOR 10uH			

Ref. No.	Part No.	Description				Remark
		< TRANSISTOR >				
Q560	8-729-805-25	TRANSISTOR	2SB1121			
Q561	8-729-425-50	TRANSISTOR	2SB1462Q			
Q562	8-729-402-81	TRANSISTOR	XN4501			
		< RESISTOR >				
R562	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R563	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R564	1-216-864-11	METAL CHIP	0	5%	1/16W	
R565	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R566	1-218-857-11	METAL CHIP	2.7K	0.50%	1/16W	
R567	1-216-295-91	CONDCTOR, CHIP (2012)				
R568	1-216-168-00	METAL GLAZE	56	5%	1/8W	
R569	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R570	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R571	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R572	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R590	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R591	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
		< FLEXIBLE BOARD >				
W500	1-651-889-11	FP-48 FLEXIBLE BOARD				
W501	1-642-186-11	FP-437 FLEXIBLE BOARD				

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A-7066-357-A VC-142 BOARD, COMPLETE
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(Ref.No. 2,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description				Remark
C601	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C604	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C605	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C606	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C607	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C609	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C610	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C616	1-135-091-91	TANTAL. CHIP	1uF	20%	16V	
C617	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C618	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C619	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C620	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C621	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C622	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C623	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C624	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C627	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C628	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C629	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C630	1-162-946-11	CERAMIC CHIP	27PF	5%	50V	
C631	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C632	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C633	1-162-946-11	CERAMIC CHIP	27PF	5%	50V	
C634	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C635	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C636	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C637	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C638	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C639	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C697	1-162-947-11	CERAMIC CHIP	33PF	5%	50V	
C698	1-162-947-11	CERAMIC CHIP	33PF	5%	50V	
C699	1-162-954-11	CERAMIC CHIP	120PF	5%	50V	
C701	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V	
C702	1-162-638-11	CERAMIC CHIP	1uF		16V	
C703	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C704	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C705	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V	
C706	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C708	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C709	1-135-214-21	TANTAL. CHIP	4.7uF	20%	20V	
C710	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C711	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C712	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C713	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V	
C714	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C715	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C716	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C717	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C718	1-162-637-11	CERAMIC CHIP	0.47uF		16V	
C719	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C720	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C721	1-162-917-11	CERAMIC CHIP	15PF	5%	50V	
C722	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C724	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C725	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C726	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C727	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C728	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C729	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C730	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V	
C731	1-135-091-91	TANTAL. CHIP	1uF	20%	16V	
C732	1-162-638-11	CERAMIC CHIP	1uF		16V	
C733	1-162-638-11	CERAMIC CHIP	1uF		16V	
C734	1-135-091-91	TANTAL. CHIP	1uF	20%	16V	
C735	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C737	1-162-946-11	CERAMIC CHIP	27PF	5%	50V	
C739	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C741	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	
C742	1-164-360-11	CERAMIC CHIP	0.1uF		16V	
C743	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	

Ref.No.	Part No.	Description			Remark
C744	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C745	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C746	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C747	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C748	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C749	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C750	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C751	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C752	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C753	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C754	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C755	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C756	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C757	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C771	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C772	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C773	1-164-299-11	CERAMIC CHIP	0.22uF	10%	25V
C774	1-128-257-21	ELECT CHIP	33uF	20%	10V
C775	1-128-257-21	ELECT CHIP	33uF	20%	10V
C776	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C777	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C778	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C779	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C780	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C781	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C782	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C783	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C784	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C785	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C786	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C788	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C789	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C790	1-164-299-11	CERAMIC CHIP	0.22uF	10%	25V
C793	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C794	1-164-360-11	CERAMIC CHIP	0.1uF		16V
		< CONNECTOR >			
* CN601	1-764-395-21	CONNECTOR, BOARD TO BOARD 42P			
* CN701	1-573-356-11	CONNECTOR, FFC/FPC 16P			
CN751	1-573-361-11	CONNECTOR, FFC/FPC 21P			
CN775	1-691-487-21	CONNECTOR, FFC/FPC 8P			
		< TRIMMER >			
CT701	1-141-356-11	CAP, ADJ			
		< DIODE >			
D701	8-719-404-46	DIODE	MA110		
D702	8-719-404-46	DIODE	MA110		
D703	8-719-404-46	DIODE	MA110		
D705	8-719-404-46	DIODE	MA110		

Ref.No.	Part No.	Description	Remark
		< FILTER >	
FL601	1-239-352-11	FILTER, LOW PASS	
		< IC >	
IC601	8-759-278-57	IC AK6420HF-E2	
IC602	8-759-277-18	IC MC68HC11MA8FU(SC424609)	
IC603	8-759-064-36	IC MB88346BPFV	
IC609	8-752-369-23	IC CXD2150AR-T6	
IC610	8-752-365-72	IC CXD2151R-T6	
IC611	8-759-262-36	IC CXD2133BR-T6	
IC613	8-759-297-76	IC CXD2152AREL	
IC614	8-759-255-09	IC uPD6461GS-802-GLG-E2	
IC701	8-752-355-07	IC CXD1267N-T4	
IC702	8-752-365-73	IC CXD2405R-T4	
IC703	8-752-069-21	IC CXA1690Q-T4	
IC704	8-759-263-29	IC HD49315FEB	
IC705	8-752-375-12	IC CXD2407BR-T4	
IC751	8-759-701-24	IC NJM3414M	
IC752	8-759-058-50	IC XRA10324AF-E2	
IC752	8-759-100-95	IC uPC324G2	
IC753	8-752-365-65	IC CXD2126N-T4	
IC754	8-759-247-07	IC MPC17A34VMEL	
IC755	8-759-031-58	IC SC7SU04F	
IC772	8-759-234-77	IC TC4S66F	
IC773	8-759-234-77	IC TC4S66F	
IC774	8-759-058-45	IC NJM3403AV(TE2)	
IC775	8-759-080-34	IC TA75W01FU-TE12R	
IC776	8-759-248-78	IC MB88102PFV-G-BND-ER	
IC777	8-752-847-36	IC CXP87132-016R	
		< COIL >	
L601	1-412-058-11	INDUCTOR CHIP 10uH	
L602	1-414-078-11	INDUCTOR 10uH	
L603	1-412-058-11	INDUCTOR CHIP 10uH	
L604	1-414-078-11	INDUCTOR 10uH	
L605	1-410-391-11	INDUCTOR CHIP 68uH	
L606	1-414-078-11	INDUCTOR 10uH	
L607	1-414-078-11	INDUCTOR 10uH	
L608	1-412-006-31	INDUCTOR CHIP 10uH	
L609	1-412-979-21	INDUCTOR 1uH	
L610	1-412-979-21	INDUCTOR 1uH	
L611	1-412-052-21	INDUCTOR CHIP 1uH	
L612	1-412-052-21	INDUCTOR CHIP 1uH	
L614	1-412-052-21	INDUCTOR CHIP 1uH	
L702	1-412-058-11	INDUCTOR CHIP 10uH	
L703	1-412-058-11	INDUCTOR CHIP 10uH	
L704	1-412-058-11	INDUCTOR CHIP 10uH	
L705	1-412-058-11	INDUCTOR CHIP 10uH	
L706	1-412-058-11	INDUCTOR CHIP 10uH	
L751	1-412-062-11	INDUCTOR CHIP 47uH	

Ref.No.	Part No.	Description	Remark
L752	1-412-058-11	INDUCTOR CHIP 10uH	
L753	1-412-058-11	INDUCTOR CHIP 10uH	
L775	1-412-058-11	INDUCTOR CHIP 10uH	
L777	1-414-078-11	INDUCTOR 10uH	
L778	1-414-078-11	INDUCTOR 10uH	
		< TRANSISTOR >	
Q604	8-729-010-60	TRANSISTOR MSA1586-BC	
Q604	8-729-230-60	TRANSISTOR 2SA1586-YG	
Q604	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q605	8-729-010-60	TRANSISTOR MSA1586-BC	
Q605	8-729-230-60	TRANSISTOR 2SA1586-YG	
Q605	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q606	8-729-010-75	TRANSISTOR MSC4116-BC	
Q606	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q606	8-729-602-21	TRANSISTOR 2SC4154	
Q607	8-729-010-75	TRANSISTOR MSC4116-BC	
Q607	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q607	8-729-602-21	TRANSISTOR 2SC4154	
Q701	8-729-403-27	TRANSISTOR XN4401	
Q751	8-729-010-75	TRANSISTOR MSC4116-BC	
Q751	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q751	8-729-602-21	TRANSISTOR 2SC4154	
Q752	8-729-013-88	TRANSISTOR RN1302-TE85L	
Q752	8-729-015-76	TRANSISTOR UN5211-TX	
		< RESISTOR >	
R601	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R602	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R603	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R604	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R605	1-216-864-11	METAL CHIP 0 5% 1/16W	
R608	1-216-864-11	METAL CHIP 0 5% 1/16W	
R612	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R613	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R614	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R615	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R619	1-216-803-11	METAL CHIP 33 5% 1/16W	
R620	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R621	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R622	1-216-864-11	METAL CHIP 0 5% 1/16W	
R624	1-216-864-11	METAL CHIP 0 5% 1/16W	
R626	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R627	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R628	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R629	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
R630	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R631	1-216-864-11	METAL CHIP 0 5% 1/16W	
R634	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R635	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	

Ref.No.	Part No.	Description	Remark
R636	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R637	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R638	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R639	1-216-864-11	METAL CHIP 0 5% 1/16W	
R640	1-216-815-11	METAL CHIP 330 5% 1/16W	
R642	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R643	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R645	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R646	1-216-818-11	METAL CHIP 560 5% 1/16W	
R647	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R648	1-216-818-11	METAL CHIP 560 5% 1/16W	
R649	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R650	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R651	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R652	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R653	1-216-864-11	METAL CHIP 0 5% 1/16W	
R657	1-216-864-11	METAL CHIP 0 5% 1/16W	
R658	1-216-864-11	METAL CHIP 0 5% 1/16W	
R659	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R661	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R662	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R663	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R664	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R665	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R666	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R667	1-216-820-11	METAL CHIP 820 5% 1/16W	
R668	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R701	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R702	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R703	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R704	1-216-840-11	METAL CHIP 39K 5% 1/16W	
R705	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R709	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R711	1-216-864-11	METAL CHIP 0 5% 1/16W	
R713	1-216-807-11	METAL CHIP 68 5% 1/16W	
R714	1-216-864-11	METAL CHIP 0 5% 1/16W	
R715	1-216-864-11	METAL CHIP 0 5% 1/16W	
R716	1-218-847-11	METAL CHIP 1K 0.50% 1/16W	
R717	1-216-864-11	METAL CHIP 0 5% 1/16W	
R718	1-216-807-11	METAL CHIP 68 5% 1/16W	
R719	1-218-876-11	METAL CHIP 16K 0.50% 1/16W	
R720	1-216-843-11	METAL CHIP 68K 5% 1/16W	
R721	1-216-864-11	METAL CHIP 0 5% 1/16W	
R722	1-216-864-11	METAL CHIP 0 5% 1/16W	
R724	1-216-864-11	METAL CHIP 0 5% 1/16W	
R725	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R740	1-216-864-11	METAL CHIP 0 5% 1/16W	
R741	1-218-855-11	METAL CHIP 2.2K 0.50% 1/16W	
R742	1-218-865-11	METAL CHIP 5.6K 0.50% 1/16W	
R743	1-216-833-11	METAL CHIP 10K 5% 1/16W	

Ref.No.	Part No.	Description	Remark
R744	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R745	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R746	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R747	1-216-820-11	METAL CHIP 820 5% 1/16W	
R748	1-216-828-11	METAL CHIP 3.9K 5% 1/16W	
R749	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R750	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R751	1-216-809-11	METAL CHIP 100 5% 1/16W	
R752	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R753	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R754	1-216-848-11	METAL CHIP 180K 5% 1/16W	
R755	1-216-855-11	METAL CHIP 680K 5% 1/16W	
R756	1-216-848-11	METAL CHIP 180K 5% 1/16W	
R757	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R758	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R759	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R760	1-216-826-11	METAL CHIP 2.7K 5% 1/16W	
R761	1-216-842-11	METAL CHIP 56K 5% 1/16W	
R762	1-216-842-11	METAL CHIP 56K 5% 1/16W	
R764	1-216-828-11	METAL CHIP 3.9K 5% 1/16W	
R765	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R766	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R767	1-216-850-11	METAL CHIP 270K 5% 1/16W	
R768	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R769	1-216-850-11	METAL CHIP 270K 5% 1/16W	
R770	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R771	1-216-803-11	METAL CHIP 33 5% 1/16W	
R772	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R773	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R774	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R775	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R776	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R777	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R778	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R779	1-218-911-11	METAL CHIP 470K 0.50% 1/16W	
R780	1-218-911-11	METAL CHIP 470K 0.50% 1/16W	
R781	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R782	1-218-911-11	METAL CHIP 470K 0.50% 1/16W	
R783	1-218-911-11	METAL CHIP 470K 0.50% 1/16W	
R786	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R787	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R788	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R789	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R790	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R791	1-216-864-11	METAL CHIP 0 5% 1/16W	
R792	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R793	1-216-841-11	METAL CHIP 47K 5% 1/16W	

< VIBRATOR >

Ref.No.	Part No.	Description	Remark
X601	1-760-081-21	VIBRATOR, CERAMIC (24MHz)	
X701	1-760-320-11	VIBRATOR, CRYSTAL (28.6363MHz)	
X775	1-579-553-11	VIBRATOR (12MHz)	

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A-7063-779-A VF-68 BOARD, COMPLETE

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(Ref.No. 5,000 Series)

< CAPACITOR >

Ref.No.	Part No.	Description	Remark
C804	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
C805	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C806	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C807	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
C808	1-135-145-11	TANTALUM CHIP 0.47uF 10% 35V	
C809	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C810	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C811	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C812	1-135-179-21	TANTAL. CHIP 2.2uF 20% 16V	
C813	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C814	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C815	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C816	1-164-699-11	CERAMIC CHIP 0.0033uF 5% 50V	
C817	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C818	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C819	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C820	1-164-357-11	CERAMIC CHIP 1000PF 5% 50V	
C821	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C822	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
C823	1-164-346-11	CERAMIC CHIP 1uF 16V	
C824	1-162-968-11	CERAMIC CHIP 0.0047uF 10% 50V	
C825	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C828	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C829	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C830	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C832	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C833	1-164-361-11	CERAMIC CHIP 0.047uF 16V	
C834	1-164-361-11	CERAMIC CHIP 0.047uF 16V	
C835	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C838	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C839	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C840	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C842	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C844	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C845	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C846	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C847	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C848	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C849	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C850	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C851	1-164-360-11	CERAMIC CHIP 0.1uF 16V	

Ref.No.	Part No.	Description			Remark
C852	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C853	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C862	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C863	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C864	1-135-179-21	TANTAL. CHIP	2.2uF	20%	16V
C865	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C866	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C867	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C868	1-164-346-11	CERAMIC CHIP	1uF		16V
C872	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C873	1-164-005-11	CERAMIC CHIP	0.47uF		25V

< CONNECTOR >

Ref.No.	Part No.	Description
CN801	1-573-990-21	CONNECTOR, BOARD TO BOARD 10P
* CN802	1-573-356-11	CONNECTOR, FFC/FPC 16P
CN803	1-573-351-11	CONNECTOR, FFC/FPC 11P

< DIODE >

Ref.No.	Part No.	Description	
D801	8-719-025-91	DIODE	MA365(E)-TX
D802	8-719-984-02	DIODE	BR4371F (TALLY)

< IC >

Ref.No.	Part No.	Description	
IC801	8-752-058-96	IC	CXA1585Q-T4
IC802	8-752-058-95	IC	CXA1515Q-T4
IC803	8-752-371-14	IC	CXD2403R-T4

< COIL >

Ref.No.	Part No.	Description
L801	1-414-078-11	INDUCTOR 10uH
L803	1-414-078-11	INDUCTOR 10uH
L805	1-412-962-11	INDUCTOR 82uH
L806	1-412-962-11	INDUCTOR 82uH
L807	1-412-962-11	INDUCTOR 82uH
L808	1-412-950-11	INDUCTOR 8.2uH
L809	1-412-962-11	INDUCTOR 82uH
L810	1-410-192-51	INDUCTOR CHIP 1uH

< TRANSISTOR >

Ref.No.	Part No.	Description	
Q801	8-729-427-74	TRANSISTOR	XP4601
Q802	8-729-425-64	TRANSISTOR	2SD2216Q

< RESISTOR >

Ref.No.	Part No.	Description			Remark
R801	1-218-958-11	METAL GLAZE	2.7K	5%	1/16W
R802	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R803	1-218-955-11	METAL GLAZE	1.5K	5%	1/16W
R805	1-218-962-11	METAL GLAZE	5.6K	5%	1/16W
R806	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R807	1-218-970-11	METAL GLAZE	27K	5%	1/16W
R808	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R809	1-218-953-11	METAL GLAZE	1K	5%	1/16W
R810	1-218-953-11	METAL GLAZE	1K	5%	1/16W
R811	1-218-953-11	METAL GLAZE	1K	5%	1/16W
R812	1-218-966-11	METAL GLAZE	12K	5%	1/16W
R813	1-218-973-11	METAL GLAZE	47K	5%	1/16W
R814	1-218-989-11	METAL GLAZE	1M	5%	1/16W
R815	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R816	1-218-971-11	METAL GLAZE	33K	5%	1/16W
R817	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R818	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R819	1-218-980-11	METAL GLAZE	180K	5%	1/16W
R820	1-218-970-11	METAL GLAZE	27K	5%	1/16W
R821	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R822	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R823	1-218-971-11	METAL GLAZE	33K	5%	1/16W
R824	1-218-990-11	CONDCTOR, CHIP	(1005)		
R825	1-218-989-11	METAL GLAZE	1M	5%	1/16W
R826	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R827	1-218-971-11	METAL GLAZE	33K	5%	1/16W
R828	1-218-984-11	METAL GLAZE	390K	5%	1/16W
R829	1-218-984-11	METAL GLAZE	390K	5%	1/16W
R830	1-218-984-11	METAL GLAZE	390K	5%	1/16W
R831	1-218-944-11	METAL GLAZE	180	5%	1/16W
R833	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R834	1-218-971-11	METAL GLAZE	33K	5%	1/16W
R835	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R836	1-218-976-11	METAL GLAZE	82K	5%	1/16W
R837	1-218-990-11	CONDCTOR, CHIP	(1005)		
R838	1-218-973-11	METAL GLAZE	47K	5%	1/16W
R839	1-218-990-11	CONDCTOR, CHIP	(1005)		
R840	1-218-973-11	METAL GLAZE	47K	5%	1/16W
R841	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R842	1-218-953-11	METAL GLAZE	1K	5%	1/16W
R843	1-218-971-11	METAL GLAZE	33K	5%	1/16W
R849	1-218-965-11	METAL GLAZE	10K	5%	1/16W
R850	1-216-835-11	METAL CHIP	15K	5%	1/16W
R856	1-218-990-11	CONDCTOR, CHIP	(1005)		
R861	1-218-873-11	METAL CHIP	12K	0.50%	1/16W
R862	1-218-905-11	METAL CHIP	270K	0.50%	1/16W
R863	1-218-969-11	METAL GLAZE	22K	5%	1/16W
R864	1-218-981-11	METAL GLAZE	220K	5%	1/16W
R865	1-218-953-11	METAL GLAZE	1K	5%	1/16W
R866	1-218-952-11	METAL GLAZE	820	5%	1/16W
R867	1-218-967-11	METAL GLAZE	15K	5%	1/16W
R868	1-218-966-11	METAL GLAZE	12K	5%	1/16W

< VARIABLE RESISTOR >

Ref.No.	Part No.	Description
RV802	1-241-480-11	RES, ADJ, CERMET 47K
RV803	1-241-480-11	RES, ADJ, CERMET 47K
RV804	1-241-480-11	RES, ADJ, CERMET 47K

Ref. No.	Part No.	Description			Remark
		< VIBRATOR >			
X801	1-579-466-11	VIBRATOR, CRYSTAL (3.58MHz)			

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Ref. No.	Part No.	Description			Remark
⚠	A-7063-780-A	VF-69 BOARD, COMPLETE ********************** (Ref.No. 5,000 Series)			
		< CAPACITOR >			
C951	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C954	1-164-346-11	CERAMIC CHIP	1uF		16V
C955	1-164-676-11	CERAMIC CHIP	2200PF	5%	16V
C957	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C958	1-104-916-11	TANTAL. CHIP	6.8uF	20%	20V
C959	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C960	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C961	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C963	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C964	1-164-836-11	CERAMIC CHIP	6.8uF		16V
C964	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C966	1-165-128-11	CERAMIC CHIP	0.22uF		16V
C969	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C970	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C971	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C972	1-135-177-21	TANTALUM CHIP	1uF	20%	20V
C973	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C974	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C975	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C976	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C977	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C978	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C979	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C980	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C981	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
		< CONNECTOR >			
CN951	1-580-789-21	PIN, CONNECTOR (SMD) 6P			
CN953	1-573-351-11	CONNECTOR, FFC/FPC 11P			
* CN955	1-580-267-11	CONNECTOR, BOARD TO BOARD 20P			
		< DIODE >			
D951	8-719-043-70	DIODE	MA6S121-(TX)		
D952	8-719-404-19	DIODE	LN1251C		
D954	8-719-802-36	DIODE	1SS250		
D955	8-719-820-41	DIODE	1SS302		
D956	8-719-027-45	DIODE	MA740		
D957	8-719-027-45	DIODE	MA740		
D958	8-719-420-14	DIODE	MA8082-M		
D959	8-719-420-14	DIODE	MA8082-M		
D960	8-719-420-14	DIODE	MA8082-M		

Ref. No.	Part No.	Description				Remark
		< IC >				
IC951	8-759-097-75	IC	MB3789PFV-G-BND-ER			
IC952	8-759-070-51	IC	SN74HCU04ADB			
IC954	8-759-998-98	IC	LM358D			
		< COIL >				
L951	1-414-080-11	INDUCTOR 22uH				
L952	1-412-029-11	INDUCTOR CHIP 10uH				
L953	1-412-030-11	INDUCTOR CHIP 22uH				
		< TRANSISTOR >				
Q951	8-729-929-24	TRANSISTOR	DTC143TE-TL			
⚠Q953	8-729-024-60	TRANSISTOR	MTD6N15T4			
Q954	8-729-928-54	TRANSISTOR	DTA123JE-TL			
		< RESISTOR >				
R951	1-218-971-11	METAL GLAZE	33K	5%	1/16W	
R953	1-218-981-11	METAL GLAZE	220K	5%	1/16W	
R954	1-218-975-11	METAL GLAZE	68K	5%	1/16W	
R957	1-218-973-11	METAL GLAZE	47K	5%	1/16W	
R958	1-218-965-11	METAL GLAZE	10K	5%	1/16W	
R959	1-218-899-11	METAL CHIP	150K	0.50%	1/16W	
R960	1-218-901-11	METAL CHIP	180K	0.50%	1/16W	
R961	1-218-982-11	METAL GLAZE	270K	5%	1/16W	
R962	1-218-973-11	METAL GLAZE	47K	5%	1/16W	
R963	1-218-970-11	METAL GLAZE	27K	5%	1/16W	
R965	1-218-975-11	METAL GLAZE	68K	5%	1/16W	
R966	1-218-973-11	METAL GLAZE	47K	5%	1/16W	
R967	1-218-903-11	METAL CHIP	220K	0.50%	1/16W	
R968	1-218-899-11	METAL CHIP	150K	0.50%	1/16W	
R970	1-218-980-11	METAL GLAZE	180K	5%	1/16W	
R971	1-218-970-11	METAL GLAZE	27K	5%	1/16W	
R973	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R974	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R975	1-216-846-11	METAL CHIP	120K	5%	1/16W	
R978	1-218-969-11	METAL GLAZE	22K	5%	1/16W	
R979	1-218-961-11	METAL GLAZE	4.7K	5%	1/16W	
R980	1-218-936-11	METAL GLAZE	39	5%	1/16W	
R981	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R982	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R983	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R984	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R985	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R986	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R987	1-216-295-91	CONDCTOR, CHIP (2012)				
R991	1-216-296-00	METAL CHIP	0	5%	1/8W	
R997	1-218-973-11	METAL GLAZE	47K	5%	1/16W	
R998	1-218-977-11	METAL GLAZE	100K	5%	1/16W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

< VARIABLE RESISTOR >

Ref.No.	Part No.	Description	Remark
RV951	1-241-480-11	RES, ADJ, CERMET 47K	
RV953	1-230-523-11	RES, ADJ, METAL 10K	
RV954	1-230-523-11	RES, ADJ, METAL 10K	
RV955	1-230-523-11	RES, ADJ, METAL 10K	

< TRANSFORMER >

Ref.No.	Part No.	Description	Remark
⚠T951	1-423-813-11	TRANSFORMER, INVERTER	

* * *

A-7066-356-A VS-111 BOARD, COMPLETE

(Ref.No. 10,000 Series)

< CAPACITOR >

Ref.No.	Part No.	Description			Remark
C101	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C102	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C103	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C104	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C106	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C107	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C108	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C109	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C110	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C111	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C112	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C113	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C114	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C115	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C116	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C117	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C118	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C119	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C120	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C121	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C122	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C123	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C124	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C128	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C131	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C134	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C136	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C137	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C143	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C144	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C145	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C146	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C147	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C148	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C149	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C150	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C151	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C152	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C153	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C154	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C157	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C158	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C159	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C160	1-162-920-11	CERAMIC CHIP	27PF	5%	50V
C161	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C163	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C164	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C165	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C166	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C167	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C168	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C169	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C172	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C177	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C178	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C179	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C190	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C203	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C204	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C205	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C206	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C207	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C208	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C209	1-126-246-11	ELECT CHIP	220uF	20%	4V
C210	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C211	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C212	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C213	1-135-176-21	TANTALUM CHIP	0.68uF	10%	20V
C214	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C215	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C216	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C217	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C218	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C220	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C222	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C223	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C225	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C226	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C227	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C228	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C229	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C230	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C231	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C234	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C235	1-126-207-11	ELECT CHIP	33uF	20%	4V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
C237	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C238	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C239	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C240	1-164-392-11	CERAMIC CHIP	390PF	5%	50V
C241	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C242	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C243	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C244	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C245	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C247	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C251	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C258	1-164-346-11	CERAMIC CHIP	1uF		16V
C262	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C263	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C264	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C265	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C266	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C267	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C268	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C271	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C272	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C273	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C274	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C275	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C276	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C278	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C279	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C281	1-162-928-11	CERAMIC CHIP	120PF	5%	50V
C282	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C284	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C285	1-135-318-11	TANTAL. CHIP	33uF	20%	4V
C286	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C287	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C289	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C290	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C291	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C299	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C301	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C305	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C307	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C310	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C312	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C319	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C322	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C323	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C324	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C328	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C331	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C333	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C334	1-162-909-11	CERAMIC CHIP	4PF	0.25PF	50V
C500	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C501	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C502	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C503	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C504	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C506	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C507	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C508	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C509	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C510	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C511	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C512	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C513	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C514	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C515	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C516	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C518	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C519	1-164-346-11	CERAMIC CHIP	1uF		16V
C521	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C522	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C523	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
C524	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
C526	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C527	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C528	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C529	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C530	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C531	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C532	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C533	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C534	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C535	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C536	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C537	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C538	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C539	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C540	1-162-913-11	CERAMIC CHIP	8PF	0.5PF	50V
C541	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C543	1-162-913-11	CERAMIC CHIP	8PF	0.5PF	50V
C544	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C545	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C547	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C548	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C549	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C550	1-128-530-11	ELECT CHIP	33uF	20%	10V
C552	1-164-362-11	CERAMIC CHIP	470PF	5%	50V
C559	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C560	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C561	1-128-004-11	ELECT CHIP	10uF	20%	16V
C562	1-162-974-11	CERAMIC CHIP	0.01uF		50V

Ref.No.	Part No.	Description				Remark
C563	1-164-816-11	CERAMIC CHIP	220PF	2%	50V	
C564	1-164-816-11	CERAMIC CHIP	220PF	2%	50V	
C565	1-162-995-11	CERAMIC CHIP	0.022uF		50V	
C566	1-162-995-11	CERAMIC CHIP	0.022uF		50V	
C567	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V	
C568	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C569	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C570	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C571	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C572	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C573	1-162-909-11	CERAMIC CHIP	4PF	0.25PF	50V	
C951	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C953	1-126-205-11	ELECT CHIP	47uF	20%	6.3V	
C955	1-162-974-11	CERAMIC CHIP	0.01uF		50V	
C1252	1-164-505-11	CERAMIC CHIP	2.2uF		16V	
C1256	1-164-005-11	CERAMIC CHIP	0.47uF		25V	
C1263	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C1264	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C1268	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
		< CONNECTOR >				
CN101	1-691-492-21	CONNECTOR, FFC/FPC 13P				
CN102	1-580-789-21	PIN, CONNECTOR (SMD) 6P				
CN201	1-573-353-11	CONNECTOR, FFC/FPC 13P				
* CN202	1-691-929-11	CONNECTOR, BOARD TO BOARD 34P				
* CN203	1-764-396-21	CONNECTOR, BOARD TO BOARD 42P				
CN206	1-580-789-21	PIN, CONNECTOR (SMD) 6P				
CN502	1-764-708-11	CONNECTOR, FFC/FPC (LIF) 9P				
CN503	1-764-717-11	CONNECTOR, FFC/FPC (LIF) 18P				
CN504	1-695-325-11	CONNECTOR, BOARD TO BOARD 42P				
* CN505	1-764-397-21	CONNECTOR, BOARD TO BOARD 42P				
		< DIODE >				
D101	8-719-800-76	DIODE	1SS226			
D102	8-719-404-49	DIODE	MA111			
D103	8-719-404-49	DIODE	MA111			
D201	8-719-027-50	DIODE	MA142WK-(TX)			
D204	8-719-027-50	DIODE	MA142WK-(TX)			
D208	8-719-027-50	DIODE	MA142WK-(TX)			
D216	8-719-027-50	DIODE	MA142WK-(TX)			
D217	8-719-404-49	DIODE	MA111			
D218	8-719-800-76	DIODE	1SS226			
D321	8-719-045-87	DIODE	MA4Z082WA-TX			
⚠D501	8-719-421-27	DIODE	MA728			
D504	8-719-404-49	DIODE	MA111			
D505	8-719-404-49	DIODE	MA111			
		< FILTER >				
FL201	1-236-757-21	FILTER, LOW PASS (C)				

Ref.No.	Part No.	Description		Remark
		< IC >		
IC102	8-752-069-78	IC	CXA1704R-T4	
IC201	8-752-068-58	IC	CXA1700R-T6	
IC203	8-752-366-39	IC	CXL5502N-T4	
IC205	8-752-053-21	IC	CXA1211M	
IC208	8-759-710-07	IC	NJM2234M	
IC251	8-752-069-60	IC	CXA1812Q-T4	
IC501	8-759-278-57	IC	AK6420HF-E2	
IC502	8-759-295-62	IC	S-8423DFS-T2	
IC503	8-759-267-67	IC	MB89098PFV-G-107-BND	
IC505	8-752-851-37	IC	CXP87132-009R	
IC506	8-759-169-11	IC	CXA1575M-E2	
IC508	8-759-267-62	IC	MB4470APFQ-G-BND-ER	
IC951	8-759-169-02	IC	MB88344BPFV-G-BND-ER	
		< COIL >		
L102	1-412-066-21	INDUCTOR CHIP	220uH	
L103	1-412-066-21	INDUCTOR CHIP	220uH	
L104	1-412-951-11	INDUCTOR	10uH	
L105	1-412-066-21	INDUCTOR CHIP	220uH	
L108	1-412-060-11	INDUCTOR CHIP	22uH	
L109	1-412-957-11	INDUCTOR	33uH	
L110	1-410-657-21	INDUCTOR CHIP	180uH	
L111	1-412-950-11	INDUCTOR	8.2uH	
L112	1-412-280-31	INDUCTOR	330uH	
L113	1-412-957-11	INDUCTOR	33uH	
L114	1-412-282-41	INDUCTOR	470uH	
L115	1-412-280-31	INDUCTOR	330uH	
L116	1-410-657-21	INDUCTOR CHIP	180uH	
L118	1-410-655-31	INDUCTOR CHIP	120uH	
L120	1-412-951-11	INDUCTOR	10uH	
L122	1-412-058-11	INDUCTOR CHIP	10uH	
L202	1-414-078-11	INDUCTOR	10uH	
L203	1-412-955-11	INDUCTOR	22uH	
L204	1-412-963-11	INDUCTOR	100uH	
L207	1-412-945-11	INDUCTOR	3.3uH	
L209	1-412-960-21	INDUCTOR	56uH	
L213	1-412-953-11	INDUCTOR	15uH	
L214	1-412-962-11	INDUCTOR	82uH	
L500	1-414-078-11	INDUCTOR	10uH	
L501	1-414-078-11	INDUCTOR	10uH	
L502	1-414-072-11	INDUCTOR	1uH	
L503	1-412-961-11	INDUCTOR	68uH	
L504	1-414-078-11	INDUCTOR	10uH	
L506	1-414-078-11	INDUCTOR	10uH	
L951	1-414-078-11	INDUCTOR	10uH	
L952	1-414-072-11	INDUCTOR	1uH	
L1252	1-414-078-11	INDUCTOR	10uH	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

< IC LINK >

Ref.No.	Part No.	Description	Remark
⚠PS500	1-576-122-21	LINK, IC (CCP2E10 0.4A)	
⚠PS501	1-576-122-21	LINK, IC (CCP2E10 0.4A)	

< TRANSISTOR >

Ref.No.	Part No.	Description	Remark
Q101	8-729-905-23	TRANSISTOR 2SA1576-R	
Q102	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q103	8-729-216-22	TRANSISTOR 2SA1162	
Q104	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q105	8-729-402-42	TRANSISTOR UN5213	
Q106	8-729-402-42	TRANSISTOR UN5213	
Q109	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q111	8-729-015-74	TRANSISTOR UN5111-TX	
Q112	8-729-117-73	TRANSISTOR 2SC4178-F14	
Q113	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q114	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q115	8-729-012-50	TRANSISTOR 2SC4400-3/4/5	
Q117	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q119	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q126	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q129	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q132	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q133	8-729-012-50	TRANSISTOR 2SC4400-3/4/5	
Q134	8-729-402-48	TRANSISTOR UN521E-TX	
Q135	8-729-402-48	TRANSISTOR UN521E-TX	
Q202	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q204	8-729-402-42	TRANSISTOR UN5213	
Q217	8-729-420-12	TRANSISTOR XN4213	
Q219	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q225	8-729-015-76	TRANSISTOR UN5211-TX	
Q226	8-729-807-86	TRANSISTOR 2SB1295-UL5	
Q227	8-729-402-42	TRANSISTOR UN5213	
Q228	8-729-807-86	TRANSISTOR 2SB1295-UL5	
Q232	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q234	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q235	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q236	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q237	8-729-402-81	TRANSISTOR XN4501	
Q238	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q240	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q242	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q244	8-729-402-42	TRANSISTOR UN5213	
Q246	8-729-402-81	TRANSISTOR XN4501	
Q247	8-729-402-42	TRANSISTOR UN5213	
Q253	8-729-420-56	TRANSISTOR UN511E	
Q254	8-729-403-35	TRANSISTOR UN5113	
Q256	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q257	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q258	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q259	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q260	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q261	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q266	8-729-402-42	TRANSISTOR UN5213	
Q267	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q500	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q501	8-729-403-27	TRANSISTOR XN4401	
Q502	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q503	8-729-402-81	TRANSISTOR XN4501	
Q504	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q506	8-729-402-42	TRANSISTOR UN5213	
Q507	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q509	8-729-420-20	TRANSISTOR XN4312	
Q951	8-729-101-07	TRANSISTOR 2SB798-DL	
Q952	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q956	8-729-230-63	TRANSISTOR 2SC4116-YG	

< RESISTOR >

Ref.No.	Part No.	Description				Remark
R101	1-216-864-11	METAL CHIP	0	5%	1/16W	
R102	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R103	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R104	1-216-819-11	METAL CHIP	680	5%	1/16W	
R105	1-216-819-11	METAL CHIP	680	5%	1/16W	
R106	1-216-814-11	METAL CHIP	270	5%	1/16W	
R107	1-216-813-11	METAL CHIP	220	5%	1/16W	
R108	1-216-800-11	METAL GLAZE	18	5%	1/16W	
R109	1-216-804-11	METAL CHIP	39	5%	1/16W	
R110	1-216-818-11	METAL CHIP	560	5%	1/16W	
R111	1-218-875-11	METAL CHIP	15K	0.50%	1/16W	
R112	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R114	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R118	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R119	1-216-864-11	METAL CHIP	0	5%	1/16W	
R120	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R122	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R123	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R124	1-216-864-11	METAL CHIP	0	5%	1/16W	
R126	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R127	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R128	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R130	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R132	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R133	1-216-819-11	METAL CHIP	680	5%	1/16W	
R134	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R135	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R136	1-216-820-11	METAL CHIP	820	5%	1/16W	
R137	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R138	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R139	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R140	1-216-813-11	METAL CHIP	220	5%	1/16W	
R141	1-216-817-11	METAL CHIP	470	5%	1/16W	
R142	1-216-818-11	METAL CHIP	560	5%	1/16W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description				Remark
R143	1-216-808-11	METAL CHIP	82	5%	1/16W	
R144	1-216-818-11	METAL CHIP	560	5%	1/16W	
R146	1-216-809-11	METAL CHIP	100	5%	1/16W	
R147	1-216-864-11	METAL CHIP	0	5%	1/16W	
R148	1-216-813-11	METAL CHIP	220	5%	1/16W	
R149	1-216-813-11	METAL CHIP	220	5%	1/16W	
R150	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R151	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R152	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R153	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R154	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R158	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R159	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R160	1-216-818-11	METAL CHIP	560	5%	1/16W	
R162	1-216-818-11	METAL CHIP	560	5%	1/16W	
R163	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R164	1-216-864-11	METAL CHIP	0	5%	1/16W	
R165	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R166	1-216-816-11	METAL CHIP	390	5%	1/16W	
R171	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R175	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R178	1-216-809-11	METAL CHIP	100	5%	1/16W	
R179	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R180	1-216-809-11	METAL CHIP	100	5%	1/16W	
R181	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R185	1-216-847-11	METAL CHIP	150K	5%	1/16W	
R186	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R187	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R188	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R189	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R193	1-216-815-11	METAL CHIP	330	5%	1/16W	
R194	1-216-818-11	METAL CHIP	560	5%	1/16W	
R195	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R196	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R201	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R202	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R203	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R206	1-216-864-11	METAL CHIP	0	5%	1/16W	
R207	1-216-804-11	METAL CHIP	39	5%	1/16W	
R209	1-216-814-11	METAL CHIP	270	5%	1/16W	
R210	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R211	1-216-803-11	METAL CHIP	33	5%	1/16W	
R213	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R214	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R215	1-216-819-11	METAL CHIP	680	5%	1/16W	
R216	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R218	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R219	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R220	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R221	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	

Ref.No.	Part No.	Description				Remark
R222	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R223	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R224	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R226	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R230	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R231	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R232	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R234	1-216-864-11	METAL CHIP	0	5%	1/16W	
R235	1-218-877-11	METAL CHIP	18K	0.50%	1/16W	
R245	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R246	1-216-819-11	METAL CHIP	680	5%	1/16W	
R247	1-216-815-11	METAL CHIP	330	5%	1/16W	
R253	1-218-849-11	METAL CHIP	1.2K	0.50%	1/16W	
R255	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R256	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R259	1-218-859-11	METAL CHIP	3.3K	0.50%	1/16W	
R261	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R262	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R263	1-218-839-11	METAL GLAZE	470	0.50%	1/16W	
R265	1-216-818-11	METAL CHIP	560	5%	1/16W	
R272	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R273	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R274	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R279	1-216-819-11	METAL CHIP	680	5%	1/16W	
R280	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R282	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R283	1-216-864-11	METAL CHIP	0	5%	1/16W	
R285	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R286	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R288	1-216-844-11	METAL CHIP	82K	5%	1/16W	
R289	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R290	1-216-864-11	METAL CHIP	0	5%	1/16W	
R291	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R295	1-216-864-11	METAL CHIP	0	5%	1/16W	
R296	1-216-815-11	METAL CHIP	330	5%	1/16W	
R297	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R300	1-216-817-11	METAL CHIP	470	5%	1/16W	
R302	1-216-864-11	METAL CHIP	0	5%	1/16W	
R303	1-216-810-11	METAL CHIP	120	5%	1/16W	
R304	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R305	1-216-820-11	METAL CHIP	820	5%	1/16W	
R307	1-216-813-11	METAL CHIP	220	5%	1/16W	
R308	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R309	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R312	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R313	1-216-817-11	METAL CHIP	470	5%	1/16W	
R314	1-216-864-11	METAL CHIP	0	5%	1/16W	
R315	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R316	1-216-815-11	METAL CHIP	330	5%	1/16W	
R317	1-216-820-11	METAL CHIP	820	5%	1/16W	

Ref.No.	Part No.	Description				Remark
R318	1-216-820-11	METAL CHIP	820	5%	1/16W	
R319	1-216-818-11	METAL CHIP	560	5%	1/16W	
R321	1-216-813-11	METAL CHIP	220	5%	1/16W	
R322	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R323	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R324	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R325	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R328	1-216-820-11	METAL CHIP	820	5%	1/16W	
R329	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R331	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R333	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R334	1-216-815-11	METAL CHIP	330	5%	1/16W	
R338	1-216-812-11	METAL CHIP	180	5%	1/16W	
R339	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R342	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R347	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R348	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R354	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R357	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R364	1-216-864-11	METAL CHIP	0	5%	1/16W	
R366	1-216-864-11	METAL CHIP	0	5%	1/16W	
R368	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R373	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R383	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R387	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R391	1-216-864-11	METAL CHIP	0	5%	1/16W	
R395	1-216-864-11	METAL CHIP	0	5%	1/16W	
R398	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R399	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R500	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R501	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R503	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R505	1-216-864-11	METAL CHIP	0	5%	1/16W	
R506	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R507	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R508	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R509	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R510	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R511	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R512	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R513	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R514	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R515	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R517	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R518	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R519	1-216-817-11	METAL CHIP	470	5%	1/16W	
R520	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R522	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R523	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R525	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R526	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R527	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R528	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R529	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R530	1-216-019-00	METAL CHIP	56	5%	1/10W	
R531	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R532	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R533	1-217-671-11	METAL CHIP	1	5%	1/10W	
R534	1-217-671-11	METAL CHIP	1	5%	1/10W	
R535	1-217-671-11	METAL CHIP	1	5%	1/10W	
R536	1-217-671-11	METAL CHIP	1	5%	1/10W	
R537	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R538	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R539	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R540	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R541	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R542	1-216-864-11	METAL CHIP	0	5%	1/16W	
R543	1-216-864-11	METAL CHIP	0	5%	1/16W	
R544	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R546	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R548	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R549	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R550	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R551	1-216-864-11	METAL CHIP	0	5%	1/16W	
R552	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R553	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R554	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R556	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R558	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R560	1-216-296-00	METAL CHIP	0	5%	1/8W	
R561	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R562	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R563	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R567	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R569	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R570	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R572	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R573	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R575	1-216-864-11	METAL CHIP	0	5%	1/16W	
R577	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R578	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R580	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R581	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R582	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R584	1-216-864-11	METAL CHIP	0	5%	1/16W	
R585	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R586	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R587	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R588	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R589	1-216-864-11	METAL CHIP	0	5%	1/16W	

Ref.No.	Part No.	Description	Remark
R591	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R592	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R593	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R594	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R595	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R596	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R597	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R954	1-216-138-00	METAL CHIP 3.3 5% 1/8W	
R955	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R956	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R957	1-216-820-11	METAL CHIP 820 5% 1/16W	
R961	1-216-818-11	METAL CHIP 560 5% 1/16W	
R1252	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1254	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1269	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1400	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1401	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1403	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R1404	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R1406	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R1408	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R1409	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R1410	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R2003	1-216-864-11	METAL CHIP 0 5% 1/16W	

< COMPOSITION CIRCUIT BLOCK >

Ref.No.	Part No.	Description	Remark
RB500	1-236-436-11	NETWORK, RES 100K	
RB501	1-236-432-11	NETWORK, RES 47K	
RB503	1-236-432-11	NETWORK, RES 47K	
RB504	1-236-412-11	NETWORK, RES 1.0K	
RB505	1-236-412-11	NETWORK, RES 1.0K	
RB506	1-236-412-11	NETWORK, RES 1.0K	
RB507	1-236-448-11	NETWORK, RES 1.0M	
RB508	1-236-436-11	NETWORK, RES 100K	
RB509	1-236-444-11	NETWORK, RES 470K	
RB510	1-236-412-11	NETWORK, RES 1.0K	
RB512	1-236-412-11	NETWORK, RES 1.0K	
RB514	1-236-907-11	NETWORK, RES 100K	
RB515	1-236-904-11	NETWORK, RES 10K	
RB516	1-236-904-11	NETWORK, RES 10K	
RB518	1-236-971-11	NETWORK, RES 0	
RB519	1-236-971-11	NETWORK, RES 0	
RB520	1-236-904-11	NETWORK, RES 10K	
RB521	1-236-412-11	NETWORK, RES 1.0K	
RB522	1-236-448-11	NETWORK, RES 1.0M	
RB523	1-236-432-11	NETWORK, RES 47K	
RB524	1-236-908-11	NETWORK, RES 10K	
RB525	1-236-424-11	NETWORK, RES 10K	
RB526	1-236-908-11	NETWORK, RES 10K	
RB527	1-236-424-11	NETWORK, RES 10K	
RB528	1-236-424-11	NETWORK, RES 10K	
RB529	1-236-424-11	NETWORK, RES 10K	
RB530	1-236-424-11	NETWORK, RES 10K	
RB531	1-236-424-11	NETWORK, RES 10K	
RB532	1-236-424-11	NETWORK, RES 10K	
RB533	1-236-412-11	NETWORK, RES 1.0K	
RB534	1-236-412-11	NETWORK, RES 1.0K	
RB535	1-236-908-11	NETWORK, RES 10K	
RB536	1-236-412-11	NETWORK, RES 1.0K	
RB537	1-236-412-11	NETWORK, RES 1.0K	
RB542	1-236-412-11	NETWORK, RES 1.0K	
RB543	1-236-412-11	NETWORK, RES 1.0K	
RB544	1-236-412-11	NETWORK, RES 1.0K	
RB547	1-236-444-11	NETWORK, RES 470K	
RB548	1-236-416-11	NETWORK, RES 2.2K	
RB549	1-236-971-11	NETWORK, RES 0	
RB551	1-236-412-11	NETWORK, RES 1.0K	
RB552	1-236-412-11	NETWORK, RES 1.0K	
RB553	1-236-412-11	NETWORK, RES 1.0K	
RB554	1-236-971-11	NETWORK, RES 0	

< VARIABLE RESISTOR >

Ref.No.	Part No.	Description	Remark
RV202	1-238-086-11	RES, ADJ, CERMET 470	
RV202	1-238-852-11	RES, ADJ, CERMET 470	

< VIBRATOR >

Ref.No.	Part No.	Description	Remark
X201	1-579-365-21	VIBRATOR, CRYSTAL (3.58MHz)	
X501	1-579-550-11	VIBRATOR, CRYSTAL (32kHz)	
X502	1-760-314-11	VIBRATOR, CRYSTAL (11.895MHz)	
XTL501	1-579-369-21	VIBRATOR (10MHz)	

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* 1-651-920-11 ZB-2 BOARD (Ref.No. 3,000 Series)

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< BUZZER >

Ref.No.	Part No.	Description	Remark
BU101	1-529-107-11	BUZZER, PIEZOELECTRIC	

< CAPACITOR >

Ref.No.	Part No.	Description	Remark
C102	1-164-346-11	CERAMIC CHIP 1uF 16V	
C103	1-164-346-11	CERAMIC CHIP 1uF 16V	

< CONNECTOR >

Ref.No.	Part No.	Description	Remark
CN101	1-691-483-21	CONNECTOR, FFC/FPC 4P	

< BATTERY HOLDER >

Ref.No.	Part No.	Description	Remark
LI101	1-550-104-11	HOLDER, BATTERY	

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6-1. CAMERA CONTROL MICRO PROCESSOR PIN FUNCTION (VC-142 BOARD IC602: SC424609 MC68HC11MA8FU)

Pin No.	Signal Name	I/O	Function
1	VTR SO	I	Serial data input from mode control microprocessor (VS board IC503).
2	$\overline{\text{VTR SCK}}$	I	Serial data transfer clock from/to mode control microprocessor.
3	$\overline{\text{CAM CS}}$	I	Chip select signal from mode control microprocessor.
4			Not used.
5			
6			
7			
8			
9	PBV	I	V sync signal from servo/mechanism control microprocessor (VS board IC505).
10			Not used (connected to +3.6V).
11			
12	VDD		+3.6V power supply.
13	VSS		GND
14	$\overline{\text{CS TG}}$	O	Chip select signal to timing generator (IC702).
15			Not used (connected to +3.6V).
16	START	O	Operation signal of IC705. Normally "L". "H" during operation.
17	WEN	I	Write enable signal from timing generator (IC702). Normally "H".
18			Not used.
19	$\overline{\text{CS VISTA}}$	O	Chip select signal to steady shot control microprocessor (IC777).
20	$\overline{\text{CS CORE}}$	O	Chip select signal to camera core (IC609).
21	EEPROM BUSY	I	BUSY signal from EEPROM (IC601). Normally "H". "L" during data read/write.
22			Not used.
23	IRIS PWM	O	Iris control signal.
24			Not used.
25			
26	$\overline{\text{TESTX}}$	O	Test signal of IC705. "H": Camera mode, "L": Test/VTR mode.
27	LENS RST LED	O	Lens reset sensor LED ON/OFF. "H": ON, "L": OFF.
28	FC RST	I	Lens focus reset sensor signal input.
29	ZM RST	I	Lens zoom reset sensor signal input.
30	XIRQ		Connected to +3.6V.
31	VDD		+3.6V power supply.
32	VSS		GND
33			Not used.
34			
35			
36	$\overline{\text{CAM SCK}}$	O	Serial data transfer clock.
37	CAM SO	O	Serial data output.
38	CAM SI	I	Serial data input.
39			Not used.
40			
41	VDD		+3.6V power supply.
42	GENERAL A/D	I	Camera core (IC609) discrimination signal input.
43	LENS TYPE	I	Lens type discrimination signal input.
44	ZOOM SW	I	Zoom key signal input. When not pressed: 1.8V, TELE 1: 2.7V, TELE 2: 3.6V, WIDE 1: 0.9V, WIDE 2: 0V.
45	MAN FOCUS (2)	I	Manual focus dial signal (2) input. 0V to 3.4V depending on the dial turning.
46	MAN FOCUS (1)	I	Manual focus dial signal (1) input. 0V to 3.4V depending on the dial turning.
47			Not used. Connected to GND.
48			
49	HALL A/D	I	Hall voltage. Approx. 1V (iris opened) to approx. 3.5V (iris closed).
50	VRL	I	Connected to GND.
51	VRH	I	Connected to +3.6V.
52	VSS		GND
53	$\overline{\text{CS EEPROM}}$	O	Chip select signal to EEPROM (IC601).
54	$\overline{\text{CS CAM OPD}}$	O	Chip select signal to OPD (IC611).
55	D/A STB	O	Strobe signal to camera EVR (IC603).
56	EEPROM RESET	O	EEPROM (IC601) write disable signal. Normally "H".
57	$\overline{\text{CS AF OPD}}$	O	Chip select signal to AF OPD (IC611).
58	$\overline{\text{CS PDR}}$	O	Chip select signal to pre-driver (IC753).
59	$\overline{\text{CAM ON}}$	O	A/D converter (IC704) ON/OFF signal. Normally "H".
60	$\overline{\text{NTSC}}$	O	"L": NTSC, "H": PAL.
61	IRQ	I	Connected to +3.6V.
62			Not used.
63			
64	$\overline{\text{PDR RST}}$	O	Reset signal to zoom/focus pre-driver (IC753). "H": Camera mode, "L": VTR mode.
65	$\overline{\text{NRML/VST}}$	O	"H": Steady shot operation, "L": Normal operation.
66	$\overline{\text{VST/CORE RST}}$	O	Reset signal to steady shot control microprocessor (IC777) and camera core (IC609). Normally "H". "L": Reset.
67	$\overline{\text{OPD RST}}$	O	Reset signal to IC611 and IC705. "H": Camera mode, "L": VTR mode.
68			Not used. Connected to GND.
69			
70	VSS		GND
71	VDD		+3.6V power supply.
72			Not used.
73	EXTAL	I	24 MHz clock oscillation circuit.
74	XTAL	O	
75	$\overline{\text{RESET}}$	I	Reset signal from mode control microprocessor (VS board IC503). Normally "H". "L": Reset.
76	MODB		Connected to +3.6V.
77	MODA		Connected to GND.
78	RXD		Not used.
79	TXD		
80	VTR SI	O	Serial data output to mode control microprocessor (VS board IC503).

6-2. STEADY SHOT CONTROL MICRO PROCESSOR PIN FUNCTION (VC-142 BOARD IC777: CXP87132-010R)

Pin No.	Signal Name	I/O	Function
1	MPX	O	Not used.
2	$\overline{\text{ADC STBY}}$	O	Standby output to A/D converter (IC776). Normally "H".
3	C RESET	O	Reset signal to PITCH/YAW sensor amplifier (IC772 to IC774) in initializing. Normally "L".
4	PB0/PPO8	O	Not used.
5	PC7/RTO7	O	
6	PC6/RTO6	O	
7	PC5/RTO5	O	
8	PC4/RTO4	O	
9	PC3/RTO3	O	
10	PC2/PPO18	O	
11	PC1/PPO17	O	
12	PC0/PPO16	O	
13	PJ7	O	
14	PJ6	O	
15	PJ5	O	
16	PJ4	O	
17	PJ3	O	
18	PJ2	O	
19	PJ1	O	
20	PJ0	O	
21	PD7	O	
22	PD6	O	
23	PD5	O	
24	PD4	O	
25	PD3	O	
26	PD2	O	
27	PD1	O	
28	PD0	O	
29	PH7	O	
30	PH6	O	
31	PH5	O	
32	PH4	O	
33	PH3	O	
34	PH2	O	
35	PH1	O	
36	PH0	O	
37	MP	I	Connected to GND.
38	$\overline{\text{VST RST}}$	I	Reset signal from camera microprocessor (IC602). Normally "H".
39	VSS		GND. Connected to GND.
40	XTAL	O	Connected to 12 MHz crystal oscillator.
41	EXTAL	I	Connected to 12 MHz crystal oscillator.
42	$\overline{\text{CS VISTA MICOM}}$	I	Chip select signal from camera microprocessor (IC602).
43	S IN	I	Serial data input from camera microprocessor (IC602).
44	S OUT	O	Serial data output to camera microprocessor (IC602).
45	$\overline{\text{CAM SCK}}$	I	Serial data transfer clock from/to camera microprocessor (IC602).
46	PF7/AN11	O	Not used.
47	PF6/AN10	O	
48	PF5/AN9	O	
49	PF4/AN8	O	
50	AVSS		A/D port GND. Connected to GND.
51	AVREF	I	A/D port reference voltage input. Connected to +3.6V.
52	AVDD		A/D port positive power supply. Connected to +3.6V.
53	PF3/AN7	I	Not used. Connected to +3.6V.
54	PF2/AN6	I	
55	PF1/AN5	I	
56	PF0/AN4	I	
57	AN3	I	
58	AN2	I	
59	AN1	I	
60	AN0	I	
61	PG7/EX11	I	Not used. Connected to GND.
62	CGV	I	V SYNC from sync generator (IC610).
63	FLD	I	FLD signal from sync generator (IC610).
64	PG4/SYNC0	I	Not used. Connected to GND.
65	PG3//PBCTL	I	
66	PG2/DPG	I	
67	PG1/DFG	I	
68	PG0/CFG	I	
69	PE7/DAB1	O	Not used.
70	PE6/DAB0	O	
71	PE5/DAA1	O	
72	PE4/DAA0	O	
73	PE3/PWM1	O	
74	PE2/PWM0	O	
75	PE1//INT2	I	Not used. Connected to +3.6V.
76	PE0//INT0	I	
77	VISTA SI	I	Serial data input.
78	VISTA SO	O	Serial data output.
79	VISTA SCK	O	Serial data transfer clock.
80	PI4//INT1	O	Not used.

Pin No.	Signal Name	I/O	Function
81	PI3/T0	O	Not used.
82	PI2//PWM	O	
83	PI1/P0	O	
84	PI0/PCK	I	Not used. Connected to +3.6V.
85	PKO	I	
86	GND		GND
87	VDD		+3.6V power supply.
88	VPP		Connected to +3.6V.
89	(CS DISP)	O	Not used.
90	PA6/PPO6	O	
91	CS ADC	O	Chip select signal to A/D converter (IC776).
92	CS ZTG	O	Chip select signal to timing generator (IC702).
93	CS ZVST	O	Chip select signal to IC613.
94	PA2/PPO2	O	Not used.
95	PA1/PPO1	O	
96	PA0/PPO0	O	
97	PB7/PPO15	O	
98	PB6/PPO14	O	
99	PB5/PPO13	O	
100	PB4/PPO12	O	

6-3. CAMERA CORE PIN FUNCTION (VC-142 BOARD IC609: CXD2150AR)

Pin No.	Signal Name	I/O	Function	
1	OPD6	O	OPD (IC611) data output.	
2	OPD5	O	OPD data output.	
3	OPD4	O	OPD data output.	
4	OPD3	O	OPD data output.	
5	OPD2	O	OPD data output.	
6	OPD1	O	OPD data output.	
7	OPD0	O	OPD data output, LSB.	
8	OPDID	O	OPD line discrimination signal.	
9	VDD	–	Power supply (+3.6V).	
10	CO3	O	C signal output, MSB.	
11	CO2	O	C signal output .	
12	CO1	O	C signal output.	
13	CO0	O	C signal output, LSB.	
14	VSS	–	GND	
15	CI3	I	C signal input, MSB.	
16	CI2	I	C signal input.	
17	CI1	I	C signal input.	
18	CI0	I	C signal input, LSB.	
19	NRB	O	C signal. Color discrimination signal.	
20	VDD	–	+3.6V power supply.	
21	VBC		Connected to GND via 0.1 μF capacitor.	Chroma signal D/A converter interface.
22	AVSC		GND	
23	IREFC		Connected to GND via 12 kΩ resistor.	
24	VREFC	I	Full scale output value setting voltage.	
25	VGC		Connected to +3.6V power supply via 0.1 μF capacitor.	
26	AVDC		+3.6V power supply.	
27	IOC	O	Chroma signal output (Current output).	
28	VDD	–	Y I/F power supply (+3.6V).	
29	DICK	O	Memory interface reference clock.	
30	CDIS	O	Not used.	
31	YO7	O	Y signal output, MSB.	
32	YO6	O	Y signal output.	
33	YO5	O	Y signal output.	
34	YO4	O	Y signal output.	
35	YO3	O	Y signal output.	
36	YO2	O	Y signal output.	
37	YO1	O	Y signal output.	
38	YO0	O	Y signal output, LSB.	
39	DATS	I	DA test pin. (Normally fixed at "L".)	
40	YI7	I	Y signal input, MSB.	

Pin No.	Signal Name	I/O	Function	
41	YI6	I	Y signal input.	
42	YI5	I	Y signal input.	
43	YI4	I	Y signal input.	
44	YI3	I	Y signal input.	
45	YI2	I	Y signal input.	
46	YI1	I	Y signal input.	
47	YI0	I	Y signal input, LSB.	
48	VSS	–	GND	
49	IOY	O	Y signal output (current output).	Y signal D/A converter interface.
50	AVDY		+3.6V power supply.	
51	VGY		Connected to +3.6V power supply via 0.1 μF capacitor.	
52	VRFY	I	Full scale output value setting voltage.	
53	IRFY		Connected to GND via 12 kΩ resistor.	
54	AVSY		GND	
55	VBY		Connected to GND via 0.1 μF capacitor.	
56	VDD	–	+3.6V power supply	
57	BIN	I	Not used.	
58	GIN	I	Not used.	
59	RIN	I	Not used.	
60	TIKEY	I	Not used.	
61	WKEY	I	Wide ID signal input.	
62	VCK	I	PAL 4 fsc modulation clock.	
63	VHLD	I	Mosaic processing vertical hold control signal.	
64	HHLD	I	Mosaic processing horizontal hold control signal.	
65	CSYN	I	Sync signal (SYNC) input.	
66	LALT	I	PAL line modulation inverted signal input.	
67	CBK	I	Blanking signal (CBLK) input.	
68	BF	I	Burst added signal input.	
69	HD	I	Horizontal sync signal (HD) input.	
70	VD	I	Vertical sync signal (VD) input.	
71	AJST	I	Data sampling pulse input.	
72	VDD	–	+3.6V power supply.	
73	SCK	I	Serial interface clock input from camera microprocessor (IC602).	
74	SI	I	Serial interface data input from camera microprocessor.	
75	XCE	I	Serial interface enable input from camera microprocessor.	
76	SO	O	Serial interface data output to camera microprocessor.	
77	VSS	–	GND	
78	CLK	I	Clock input.	
79	DEF	I	Defect compensation position pulse.	
80	ID	I	Color line discrimination signal.	

Pin No.	Signal Name	I/O	Function
81	MCK	I	Main clock input.
82	VDD	–	+3.6V power supply.
83	XCLR	I	All clear input.
84	VDD	–	AD I/F power supply (+3.6V).
85	ADCK	O	AD converter clock output. Not used.
86	VSS	–	GND
87	AD0	I	AD data input from A/D converter (IC704), MSB.
88	AD1	I	AD data input from A/D converter.
89	AD2	I	AD data input from A/D converter.
90	AD3	I	AD data input from A/D converter.
91	AD4	I	AD data input from A/D converter.
92	AD5	I	AD data input from A/D converter.
93	AD6	I	AD data input from A/D converter.
94	AD7	I	AD data input from A/D converter.
95	AD8	I	AD data input from A/D converter.
96	AD9	I	AD data input from A/D converter, LSB.
97	VDD	–	+3.6V power supply.
98	OPD9	O	OPD (IC611) data output, MSB.
99	OPD8	O	OPD data output.
100	OPD7	O	OPD data output.

6-4. MECHANISM CONTROL MICRO PROCESSOR PIN FUNCTION
(VS-111 BOARD IC505: CXP87132-009R)

Pin No.	Signal Name	I/O	Function
1	RP PB MODE	O	REC/PB switching signal of REC/PB amplifier (VS board IC102) and ATF servo IC (VS board IC508). "H": PB.
2	$\overline{\text{FE ON}}$	O	Flying erase oscillation on/off control signal. "L": Oscillation.
3	JOG VD	O	False VD signal inserted in playback video signal during variable speed playback.
4	JOG	O	Variable speed playback/normal playback switching signal of video circuit. "H": Variable speed playback.
5	$\overline{\text{S JACK IN}}$	I	Not used.
6	$\overline{\text{PB 1.7M DET}}$	I	AFM stereo tape/monaural tape discrimination input. "H": During stereo or bilingual tape playback.
7	JACK MON/$\overline{\text{ST}}$ DET	I	Monaural/stereo discrimination input of audio output terminal. "L": When jack is inserted in right channel terminal.
8	INT VD	O	Internal VD signal.
9	SYSTEM SYNC (PBV)	O	System synchronizing signal.
10	$\overline{\text{SYNC DET}}$	O	Sync detect output. "L" when sync is detect.
11	E/$\overline{\text{L}}$ DET	I	Not used.
12	$\overline{\text{MIC MONO}}$	I	External microphone monaural/stereo discrimination input. "L": When monaural microphone is used.
13	MODE SW 0	I	Mode switch input.
14	MODE SW 1	I	
15	MODE SW 2	I	

	BL	END	EJECT	USE	LOAD	READY	TURN	REC/PB	FF
M SW 0	H	L	L	H	L	H	H	L	L
M SW 1	H	H	L	L	L	L	H	H	L
M SW 2	H	H	H	H	H	L	L	L	L

Pin No.	Signal Name	I/O	Function
16	$\overline{\text{CC DOWN SW}}$	I	Cassette compartment down switch input. "L": down
17	REC PROOF SW	I	Recording-proof switch input. "H": REC prohibition.
18	ME/$\overline{\text{MP}}$ SW	I	ME/$\overline{\text{MP}}$ switch input. "L": MP, "H": ME.
19	Hi8 MP SW	I	Hi8 MP switch input. "H": Hi8 MP, "L": Normal MP or ME.
20	$\overline{\text{LM LIM ON}}$	O	Loading motor limiter on detection signal. Normally "H": "L" when limiter is on.
21	LINE MIX	O	Audio stereo/monaural control signal.
22	MX SEL 1	O	When recording: Monaural/stereo switching signal. When playing back: Monaural/stereo/bilingual switching signal.
23	MX SEL 2	O	

When recording: Monaural/stereo switching signal.

	Monaural	Stereo
MX SEL 1	L	L
MX SEL 2	H	L

When playing back: Monaural/stereo/bilingual switching signal.

	Stereo	Main	Sub	Monaural
MX SEL 1	L	L	H	L
MX SEL 2	L	H	L	H

Pin No.	Signal Name	I/O	Function
24	MX ON/OFF	O	Matrix on/off signal. "H": Matrix on (stereo recording/playback)
25	COMP REC	O	Video input/S video input switching signal. "H": Video input.
26	CAM/$\overline{\text{LINE}}$	O	Camera input/line input switching signal. "H": Camera input.
27	$\overline{\text{WIND}}$	O	"L": Wind sound decrease on.
28	N.C.		Not used.
29	UNLOAD	O	Loading motor control signal. When unloading: "H" or "H" pulse.
30	LOAD	O	Loading motor control signal. When loading: "H" or "H" pulse.
31	$\overline{\text{LM LIM CONT}}$	O	Loading motor limiter control signal. Momentarily "H" when loading.
32	DRUM ON	O	Drum motor on/off signal. "H" (Approx. 1.3V): Drum on.
33	DRUM RVS	O	Drum rotation direction control signal. Normally "L".
34	N.C.		Not used. (open)
35	$\overline{\text{EDIT}}$	O	Video circuit normal/EDIT switching signal. "L": When edit of menu display is at "ON".
36	E/$\overline{\text{L}}$ OUT	O	Not used.
37	MP		Connected to GND.
38	$\overline{\text{RESET}}$	I	Reset signal from mode control micro processor (VS board IC503). When reset: "L".
39	VSS		GND
40	XTAL	O	11.89 MHz clock oscillation circuit.
41	EXTAL	I	
42	$\overline{\text{MECHA CON CS}}$	I	Chip select signal from mode control micro processor (VS board IC503).
43	DATA TO SLAVE	I	Serial data input from mode control micro processor.
44	DATA TO MASTER	O	Serial data output to mode control micro processor.
45	$\overline{\text{MODECON SCK}}$	I	Serial clock input from mode control micro processor.
46	AUDIO MUTE	O	Audio output mute signal. "H": Mute.
47	VIDEO MUTE	O	Video output mute signal. "H": Mute.
48	MONO REC (1.7M $\overline{\text{ON}}$/OFF)	O	Monaural/stereo recording switching signal. "H": During monaural recording (1.7 MHz REC AFM carrier off). (Note 1)
49	N.C.		
50	AVSS		A/D converter system GND.
51	AVREF		A/D converter system reference voltage. Connected to SS3.6V.
52	AVDD		A/D converter system power supply. Connected to SS3.6V.
53	EXT MIC	I	External microphone discrimination input. Not used.
54	END SENS	I	Tape end detection signal. Normally: "L", "H" pulse at tape end.
55	TOP SENS	I	Tape top detection signal. Normally: "L", "H" pulse at tape top.
56	$\overline{\text{DEW DET}}$	I	Condensation detection signal. "L" when condensation present.
57	N.C.		Not used. Connected to GND.
58	ATF ERROR	I	ATF error input.
59	S REEL FG	I	S reel FG signal input.
60	T REEL FG	I	T reel FG signal input.
61	NC		Not used. Connected to GND.
62	CAM VD	I	VD signal from camera circuit sync generator (VC board IC610). V cycle pulse.
63	FLD	I	FIELD signal from camera circuit sync generator.
64	VTR SYNC	I	Composite sync signal separated from recording/playback Y signal.
65		I	Connected to GND.
66	DRUM PG	I	Drum PG signal input. For drum phase servo. 33.3 msec. cycle "H" pulse.
67	DRUM FG	I	Drum FG signal input. For drum speed servo. 2.8 msec. cycle pulse.
68	CAP FG	I	Capstan FG signal input.
69	N.C.	O	Not used.

Pin No.	Signal Name	I/O	Function
70	T/E LED ON	O	TAPE LED on/off signal. 200 msec. cycle "H" pulse during REC/PB.
71	SP/$\overline{\text{LP}}$	O	SP/LP switching signal. "L": LP.
72	ME/$\overline{\text{MP}}$ OUT	O	Recording current switching signal. "H": ME tape.
73	CAP PWM	O	Capstan error signal output. PWM signal.
74	DRUM PWM	O	Drum error signal output. PWM signal.
75	CFG HMS	I	Capstan FG signal input.
76	5.9M ATF CLK	O	Clock signal for ATF servo IC (IC508).
77	$\overline{\text{CS TO ATF}}$	O	Chip select signal for ATF servo IC.
78	DATA TO ATF	O	Serial data output to ATF servo IC.
79	$\overline{\text{ATF SCK}}$	O	Serial clock output to ATF servo IC.
80	ATF STBY	O	Standby signal for ATF servo IC.
81	SP/LP DET	I	Discriminates recording mode.
82	CLOG DET	I	Head clog detection signal. "L": Normal.
83	REF PILOT	O	Reference pilot signal for ATF servo.
84	N.C.		Not used. Connected to GND.
85	N.C.	I	
86	VSS		GND
87	VDD		Connected to SS3.6V.
88	VPP		
89	DRUM ACC	O	Drum motor acceleration signal.
90	DRUM BLK	O	Drum motor brake signal. Normally: "L".
91	N.C.		Not used. (open)
92	N.C.	O	
93	VIDEO IN/$\overline{\text{OUT}}$	O	Video input/output switching signal. "L": Video output.
94	AUDIO $\overline{\text{IN}}$/OUT	O	Audio input/output switching signal. "H": Audio output.
95	VA PB MODE	O	REC/PB switching signal of video; audio circuit. "H": PB.
96	VI SWP	O	RF switching pulse signal for video circuit.
97	RF SWP	O	RF switching pulse signal for REC/PB amp and audio circuit.
98	HEAD CHG	O	Head switching signal. Not used.
99	CAP ON	O	Capstan driver on/off control signal. "H": Capstan on.
100	CAP FWD/$\overline{\text{RVS}}$	O	Capstan rotation direction control signal. "H": FWD. "L": RVS.

6-5. MODE CONTROL MICRO PROCESSOR PIN FUNCTIONS (VS-111 BOARD IC503: MB89098PFV-G-107-BND)

Pin No.	Signal Name	I/O	Function
1	TEST MODE 0	I	Connected to GND.
2	TEST MODE 1	I	Connected to GND.
3	X0	I	10 MHz clock oscillation circuit.
4	X1	O	
5	VSS		GND
6	$\overline{\text{RESET}}$	I	Reset input.
7	$\overline{\text{DATA SW}}$	I	Date (+) key (CK board S221) input. Normally "H". "L" when key is pressed.
8	$\overline{\text{TIME SW}}$	I	Time key (CK board S222) input. Normally "H". "L" when key is pressed.
9	$\overline{\text{EJECT SW}}$	I	Cassette eject switch (FK board S103) input. Normally "H". "L" when switch is pressed.
10	$\overline{\text{VTR MODE SW}}$	I	Power supply switch (CK board S223) input. "L" when power supply switch is at "player".
11	$\overline{\text{AGE SW}}$	I	AGE/EVENT key input. "L" when key is pressed.
12	$\overline{\text{START/STOP SW}}$	I	Start/stop key (FK board S102) input. "L" when key is pressed.
13	$\overline{\text{CC DOWN SW}}$	I	CCDOWN switch (mechanism section) input. "L" when cassette compartment is locked.
14	$\overline{\text{CAM+STBY SW}}$	I	Power supply switch (CK board S223), stand-by switch (FK board S101) input. "L" when power supply switch is at "Camera" and stand-by switch at "Standby".
15	BATT IN	I	Main battery detection input. "H" when main battery is loaded or external power supply is connected.
16	PB V	I	System sync signal from mechanism control micro processor (VS board IC505).
17	RF SWP	I	RF switching pulse.
18	$\overline{\text{LANC POWER ON}}$	I	Power on signal input from wired remote commander. "L" when power switch of remote commander is pressed.
19	$\overline{\text{LI PRE END}}$	I	Lithium battery end detection input. "L" when lithium battery has worn out or has not been loaded.
20	$\overline{\text{EEPROM WE}}$	O	EEPROM (VS board IC502) writing enable signal. "L" when writing data.
21			Not used.
22			
23	$\overline{\text{TALLY LED}}$	O	Tally LED on/off signal.
24	$\overline{\text{SYSTEM RESET}}$	O	Reset signal of all systems. Normally "H". "L" when reset.
25	N.C.	O	Not used.
26	BATT IN	I	
27	N.C.		Not used.
28	N.C.		
29	N.C.		
30	$\overline{\text{SIRCS SIG}}$	I	Infrared remote commander signal input.
31	N.C.		Not used.
32			
33	$\overline{\text{CS EEPROM}}$	O	Chip select signal to EEPROM (VS board IC502).
34	$\overline{\text{CS VIDEO}}$	O	Chip select signal to video IC (VS board IC201).
35	EVF DA STB	O	Not used.
36	$\overline{\text{CS SG}}$	O	Chip select signal to SYNC generator (VC board IC610).
37	CS DA	O	Strobe signal to DA (VS board IC951).
38	$\overline{\text{CS CAM}}$	O	Chip select signal to camera micro processor (VC board IC602).
39	N.C.	O	Not used.
40	N.C.	O	

Pin No.	Signal Name	I/O	Function
41	N.C.		Not used.
42	N.C.		
43	SEG19	O	Not used.
44	SEG18	O	
45	SEG17	O	
46	SEG16	O	
47	VCC		+3.6V power supply (+3V power supply during backup).
48	SEG15	O	Not used.
49	SEG14	O	
50	SEG13	O	
51	SEG12	O	
52	SEG11	O	
53	SEG10	O	
54	SEG09	O	
55	SEG08	O	
56			GND
57	SEG07	O	Not used.
58	SEG06	O	
59	SEG05	O	
60	SEG04	O	
61	SEG03	O	
62	SEG02	O	
63	SEG01	O	
64	SEG00	O	
65	V3	I	3.6V Not used.
66	V2	I	2.4V
67	V1	I	1.2V
68	V0	I	0V
69	COM0	O	Not used.
70	COM1	O	
71	COM2	O	
72	COM3	O	
73	$\overline{\text{CS OSD}}$	O	Chip select signal to character generator (VC board IC614).
74	$\overline{\text{CS MECHA}}$	O	Chip select signal to mechanism control micro processor (VS board IC505).
75	DATA TO MASTER	I	Serial data input signal.
76	DATA TO SLAVE	O	Serial data output signal.
77	$\overline{\text{MODECON SCK}}$	O	Serial data transfer clock.
78	N.C.	O	Not used.
79	VTR DD ON	O	VTR DC-DC converter control signal. "H" when power switch is at "Player" or "Camera".
80	CAM DD ON	O	CAMERA DC-DC converter control signal.
81	AVSS		A/D port GND.

Pin No.	Signal Name	I/O	Function
82	K AD IN 0	I	Key input. A/D port. FF key (FK board S105) STOP key (FK board S104)
83	K AD IN 1	I	Key input. A/D port. PLAY key (FK board S111) REW key (FK board S110) PAUSE key (FK board S109)
84	K AD IN 2	I	Key input. A/D port. SET key (CK board S204) SELECT (–) key (CK board S203) SELECT (+) key (CK board S202) MENU key (CK board S201)
85	K AD IN 3	I	Key input. A/D port. FOCUS MANUAL key FADER key (CK board S208) BACK LIGHT key (CK board S207) PROGRAM AE key (CK board S205)
86	K AD IN 4	I	Key input. A/D port. STEADY SHOT key (CK board S211) EDIT SEARCH (–) key (CK board) EDIT SEARCH (+) key (CK board) COUNTER RESET key (CK board)
87	N.C.		Not used.
88	N.C.		
89	N.C.		
90	AVCC		A/D port power supply (+3.6V).
91	BATT SENS	I	For main battery voltage input. (Voltage divided into 1/3.14 by R586, R587).
92	N.C.	I	Not used.
93	BRIGHA B	I	Not used.
94	BRIGHT B	I	
95	LANC IN	I	LANC serial data input.
96	LANC OUT	O	LANC serial data output.
97	BUZZER	O	Buzzer output.
98	VCC		+3.6V power supply.
99	CL1	O	32 kHz clock oscillation circuit (for clock).
100	CL0	I	

6-6. INTERFACE

6-6-1. System Control – Video/Audio Block Interface (VS-111 BOARD)

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
SP/$\overline{\text{LP}}$	O	IC505 ⑪ → (71)	H	H	H	*1	H	H
VA PB MODE	O	IC505 (95)	L	L	L	H	L	L
AUDIO MUTE	O	IC505 ㊻	L	L	L	L	L	L
VIDEO MUTE	O	IC505 ㊼	H	H	H	*6	L	L
CAM/$\overline{\text{LINE}}$	O	IC505 ㉖	L	L	L	L	H	H
JOG VD	O	IC505 ③	L	L	L	L	L	L
RP PB MODE	O	IC505 ①	H	H	H	H	H	L
$\overline{\text{FE ON}}$	O	IC505 ②	H	H	H	H	H	L
RF SWP	O	IC505 (97)	L	*2	*2	*2	*2	*2
JOG	O	IC505 ④	L	L	L	L	L	L
$\overline{\text{CS VIDEO}}$	O	IC503 ㉞	V period "L" pulse					
CS DA	O	IC503 ㊲	V period "H" pulse					
DATA TO SLVE	O	IC503 (76)	V period pulse train					
$\overline{\text{MODECON SCK}}$	I	IC503 (77)	V period pulse train					
SP/$\overline{\text{LP}}$ DET	I	IC505 (81)	L	*3	*3	L	H	H
CLOG DET	I	IC505 (82)	L	*4	*4	*4	*4	H
VTR SYNC	I	IC505 (64)	L	*5	*5	*5	*5	*5
COMP REC	O	IC505 ㉕	L	L	L	L	L	L

*1. Outputs discrimination result of the playback tape.
"H" : SP mode, "L": LP mode.
*2. 30 Hz duty 50% pulse (synchronized with drum rotation)
*3. "H": SP recording area on tape. "L": LP recording area.
*4. "H": no recording area.
*5. Composite sync signal.
*6. "H" when tape no signal.

6-6-2. System Control – Servo Block Interface (VS-111 BOARD)

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
T.REEL FG	I	IC505 (60)	–	*1	*1	*1	–	*1
S.REEL FG	I	IC505 (59)	–	*1	*1	*1	–	*1
ATF ERROR	I	IC505 (58)	–	*2	*2	*2	*2	*2
DRUM PG	I	IC505 (66)	–	*3	*3	*3	*3	*3
DRUM FG	I	IC505 (67)	–	*4	*4	*4	*4	*4
CAP FG/CFG HMS	I	IC505 (68), (75)	–	*5	*5	*5	*5	*5
CAP ON	O	IC505 (99)	L	H	H	H	L	H
REF PILOT	O	IC505 (83)	*7	*6	*6	*6	*6	*6
RP PB MODE	O	IC505 ①	H	H	H	H	H	L
DRUM RVS *9	O	IC505 ㉝	H	H	H	H	H	H
CAP FWD/$\overline{\text{RVS}}$	O	IC505 (100)	L	H	L	H	L	H
DRUM PWM	O	IC505 (74)	L	*8	*8	*8	*8	*8
CAP PWM	O	IC505 (73)	L	*8	*8	*8	L	*8
$\overline{\text{LM LIM CONT}}$ *10	O	IC505 ㉛	L	L	L	L	L	L
DRUM ON *11	O	IC505 ㉜	L	H	H	H	H	H
DRUM ACC	O	IC505 (89)	L	L	L	L	L	L
DRUM BRK	O	IC505 (90)	L	L	L	L	L	L

*1. Inputting waveform.
*2. ATF error voltage input.
*3. One PG pulse input.
*4. FG pulses input.
*5. FG pulses input.
*6. Four frequencies.
*7. f1 (102.54 kHz) or f3 (165.21 kHz) output
*8. PWM signal.
*9. Normally "H".
Temporary "L" when load (drum reverse rotation).
*10. Temporary "H" when cassette loading
(finger catch protection).
*11. "H": approx. 1.3 Vdc.

SECTION 7
ADJUSTMENTS

7-1. CAMERA SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7–26.

1-1. PREPARATIONS BEFORE ADJUSTMENT (CAMERA SECTION)

1-1-1. List of Service Tools

- Oscilloscope
- Adjusting driver
- Regulated power supply
- Color monitor
- Vectorscope
- Digital voltmeter

Ref. No.	Name	Parts Code	Usage
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	White balance check
	ND filter 0.3	J-6080-818-A	White balance check
J-3	Pattern box PTB-450	J-6082-200-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Adjusting remote commander (RM-95-remodeled partly)[Note 1]	J-6082-053-B	
J-6	Siemens star	J-6080-875-A	For checking the flange back
J-7	Extension cable (42P, 0.8 mm)	J-6082-285-A	For extension between the VC-142 board (CN601) and VS-111 board (CN203)
J-8	Extension cable (9P, 0.8 mm)	J-6082-288-A	For extension between the FK board and VS-111 board (CN502)
	Extension cable (18P, 0.8 mm)	J-6082-289-A	For extension between the CK board and VS-111 board (CN503)
J-9	Measuring pin tool for COLOR EVF	J-6082-192-A	For adjusting the COLOR EVF (Note 2.)
J-10	CPC conversion board for LCD	J-6082-290-A	For adjusting the COLOR EVF (Note 2.)

Note 1: If the micro processor IC in the adjusting remote commander is not the new micro processor (UPD7503G-C56-12), the pages cannot be switched. In this case, replace with the new micro processor (8-759-148-35).

Note 2: Use the measuring pin tool for LCD (J-9: J-6082-192-A) together with the CPC conversion board for LCD (J-10: J-6082-290-A).

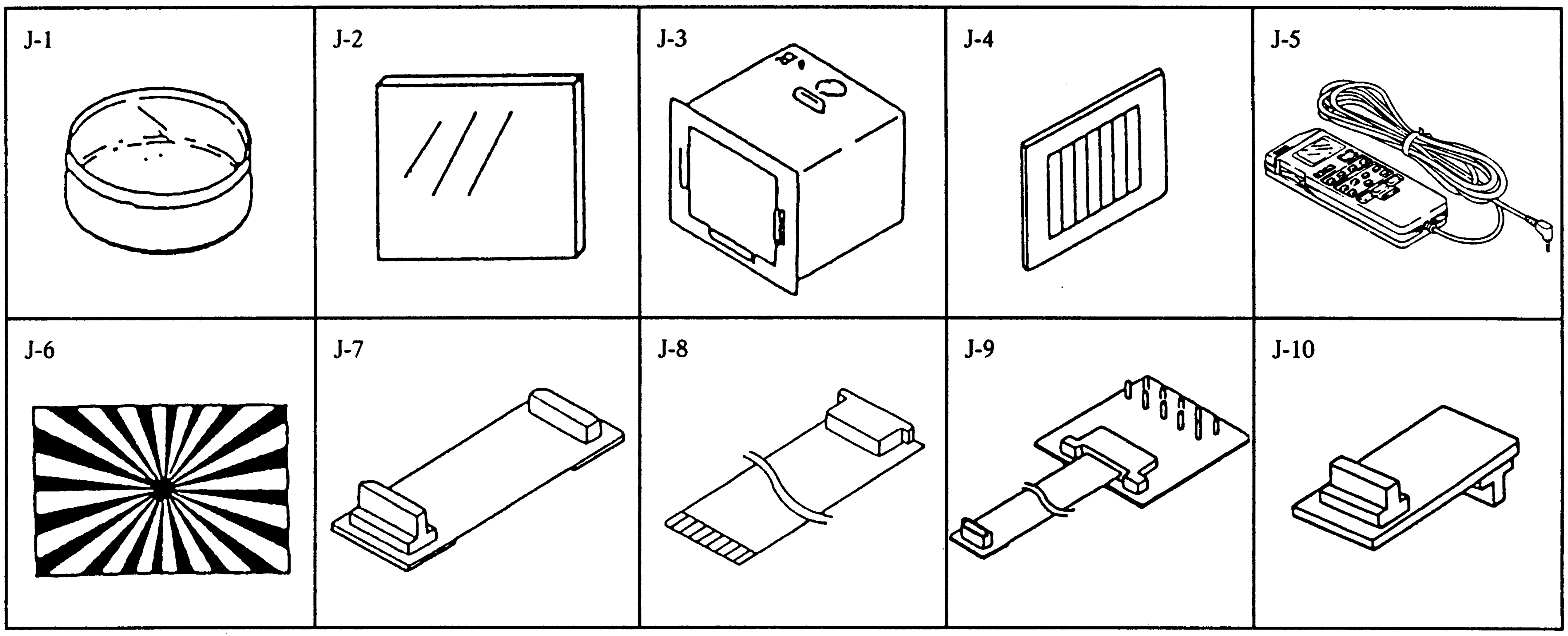


Fig. 7-1-1.

1-1-2. Preparations

Note 1: For further details of how to remove the cabinet and each board, refer to "2. Disassembly".

Note 2: When adjusting only, the lens block and VC-142 board need not be taken apart.

1) Connect the equipments for adjusting as shown in Fig. 7-1-3.
2) The F panel block (microphones) is not required in adjustments. Remove the following connector.
   1. CN002 of the MA-198 board
   2. CN003 of the MA-198 board
3) If remove the cabinet (R) (Power switch, camera function switch and electronic view-finder), set to the camera power supply ON mode (Note 1), and disconnect the following connectors.
   1. CN503 of VS-111 board
   2. CN206 of VS-111 board
   3. CN101 of ZB-2 board

   Be sure to exit this mode after completing the adjustment. (Note 2)
4) Turning OFF the Auto Focus Using the Adjusting Remote Commander
   1. Set data: 01 to page: 6, address: 25.
      (The auto focus will turn OFF. The focus can be adjusted using the focus button on the adjusting remote commander. But the HOLD switch must be set to OFF.)
   2. After completing the adjustment/operation check, set data: 00 to page: 6, address: 25.
5) Turning OFF the STEADY SHOT Function Using the Adjusting Remote Commander
   1. Set data: 02 to page: 6, address: 32.
   2. Set data: 01 to page: 6, address: 33.
      (The STEADY SHOT will go OFF.)
   3. After completing the adjustment/operation check, return the data of address: 32 and address: 33 of page: 6 to 00.

Note 1: Setting the Forced Camera Power Supply ON Mode
1) Set data: 01 to page: 1, address: 00.
2) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.

By carrying out the above, the camera can be operated even if the cabinet (R) has been removed. Be sure to exit the forced camera power ON mode after completing the adjustment.

Note 2: Exiting the Forced Camera Power Supply ON Mode
1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

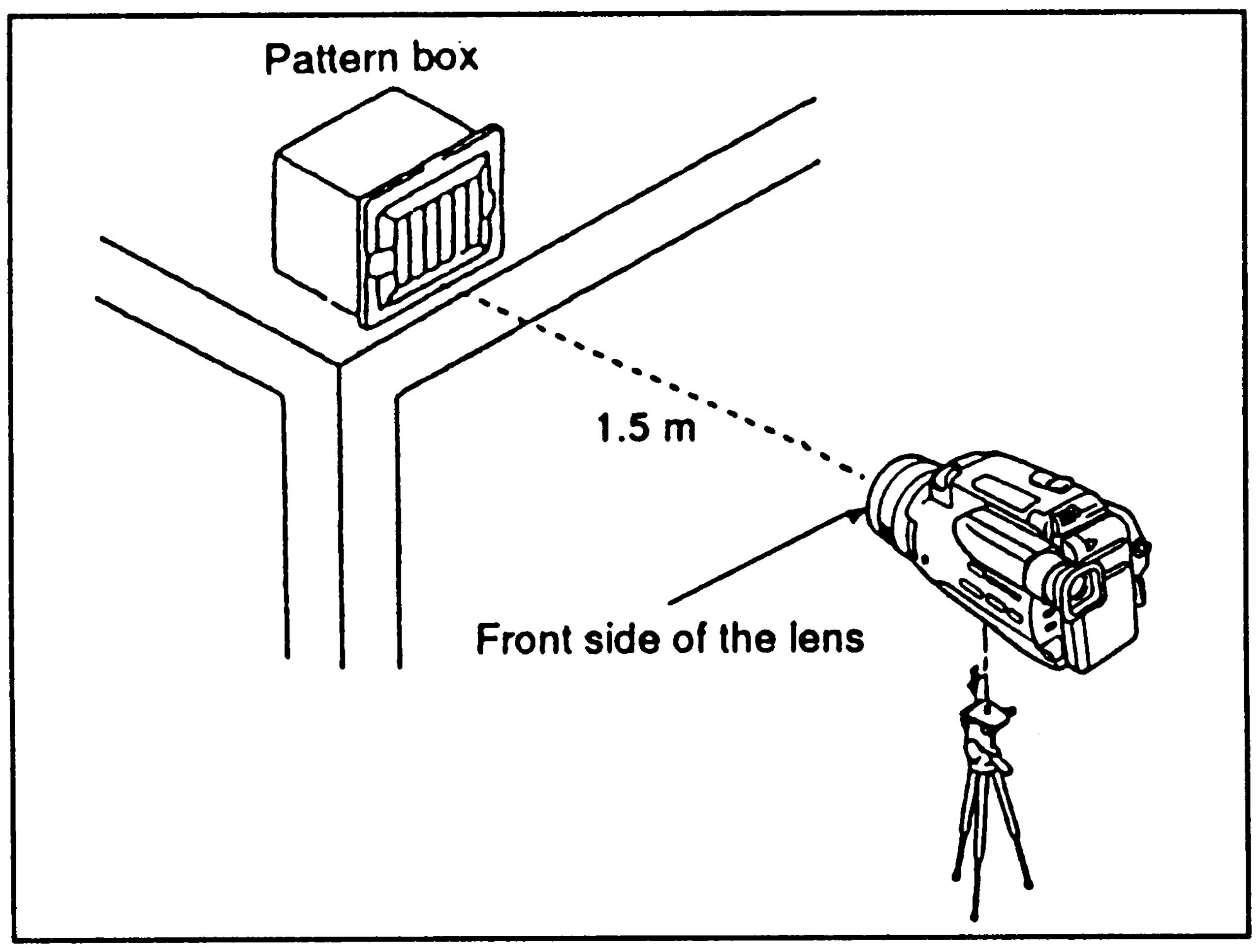


Fig. 7-1-2.

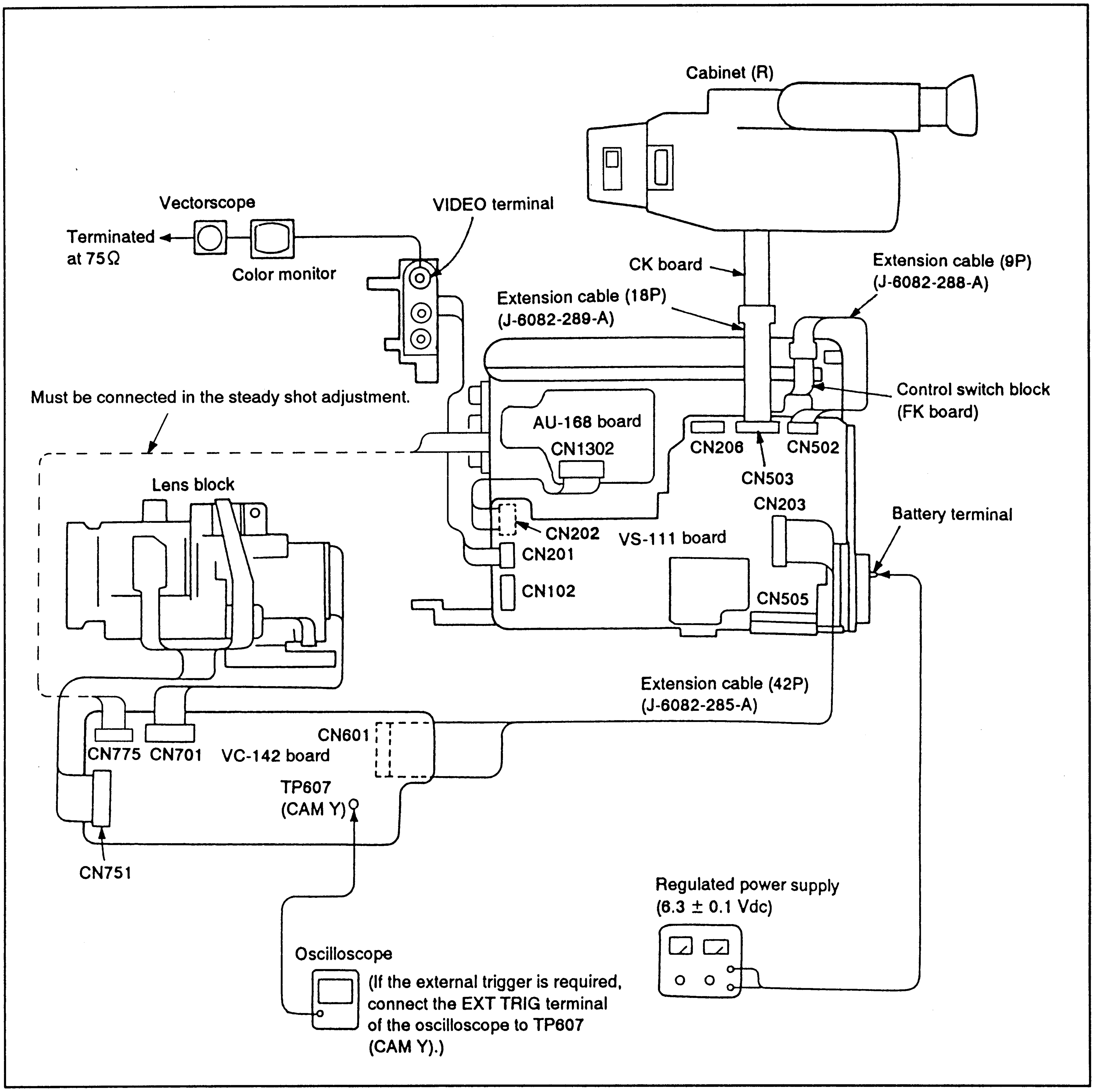

Cabinet (R)
Vectorscope
VIDEO terminal
Terminated at 75Ω
Color monitor
CK board
Extension cable (9P) (J-6082-288-A)
Extension cable (18P) (J-6082-289-A)
Control switch block (FK board)
Must be connected in the steady shot adjustment.
AU-168 board
CN1302
CN206
CN502
CN503
CN203
Lens block
Battery terminal
CN202
VS-111 board
CN201
CN102
CN505
Extension cable (42P) (J-6082-285-A)
CN601
CN775
CN701
VC-142 board
TP607 (CAM Y)
CN751
Regulated power supply (6.3 ± 0.1 Vdc)
Oscilloscope
(If the external trigger is required, connect the EXT TRIG terminal of the oscilloscope to TP607 (CAM Y).)

Fig. 7-1-3.

1-1-3. Precautions

1. Switch settings

Adjust the switches to the following positions, and adjust without loading the cassette tape, unless specified otherwise.

1. Camera/player power switch
   (Control switch block (CK board))······················Camera
2. Standby switch (Control switch block (FK board)) ·· Standby
3. PROGRAM AE button (Control switch block (CK board))
   ···Off
4. BACK LIGHT button (Control switch block (CK board))
   ···Off
5. STEADY SHOT switch (CK board)·························Off
6. FOCUS switch (Case (L) block)·························Manual

2. Adjusting Procedure

Adjust in the given order.

3. Subject

1) Color bar chart (Standard picture frame)
   Adjust the picture frame as shown in Fig. 7-1-4. if adjustments are performed using the color bar chart.
   (Standard picture frame)
2) White pattern (Standard picture frame)
   Remove the color bar chart from the pattern box, and so that the white pattern will be displayed.
   (Don't touch the zoom switch)

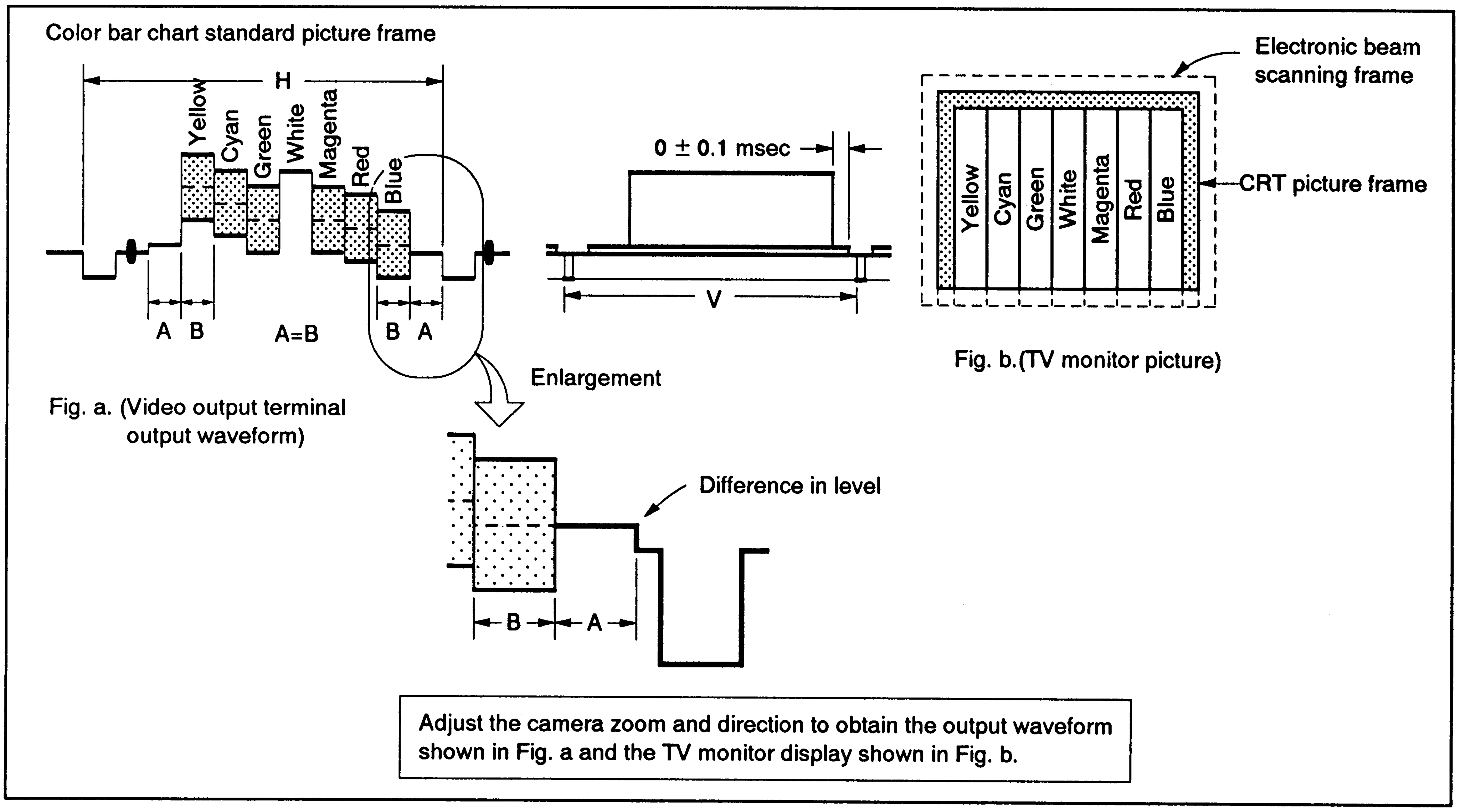

Color bar chart standard picture frame
H
Yellow
Cyan
Green
White
Magenta
Red
Blue
A B
A=B
B A
0 ± 0.1 msec
V
Enlargement
Difference in level
B
A
Electronic beam scanning frame
CRT picture frame
Yellow
Cyan
Green
White
Magenta
Red
Blue

Fig. a. (Video output terminal output waveform)

Fig. b.(TV monitor picture)

Adjust the camera zoom and direction to obtain the output waveform shown in Fig. a and the TV monitor display shown in Fig. b.

Fig. 7-1-4.

3) Chart for flange back adjustment
   Combine a white A0 size (1189 mm× 841 mm) paper to a black one, and make the chart shown in Fig. 7-1-5.

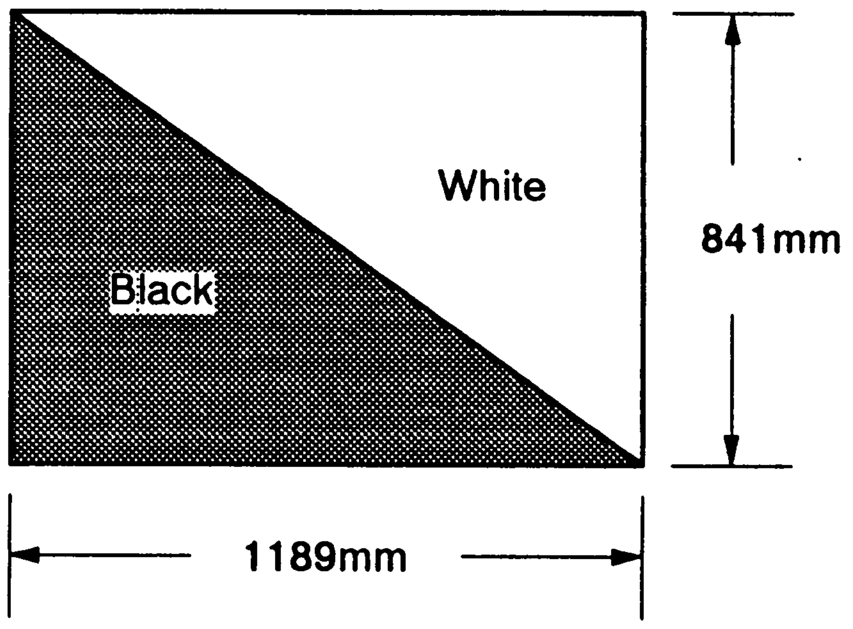

White
Black
841mm
1189mm

Fig. 7-1-5.

Note: Use the non-reflecting and non-glazing vellum paper whose size is more than A0, and make the boundary between white and black to be smoothly flat.

1-1-4. Adjusting Remote Commander

Use the adjusting remote commander to change the coefficient of the digital signal processing or the EVR data.
The adjusting remote commander uses the remote commander signal line (LANC) to perform the bidirectional communication with the camera microprocessor. The effect data of the bidirectional communication must be written in the nonvolatile memory.

1. Using the adjusting remote commander

1) Connect the adjusting remote commander to the remote terminal.
2) Adjust the HOLD switch of the adjusting remote commander to "HOLD" (SERVICE position).

If it has been properly connected, the LCD on the adjusting remote commander will display as shown in Fig. 7-1-6.

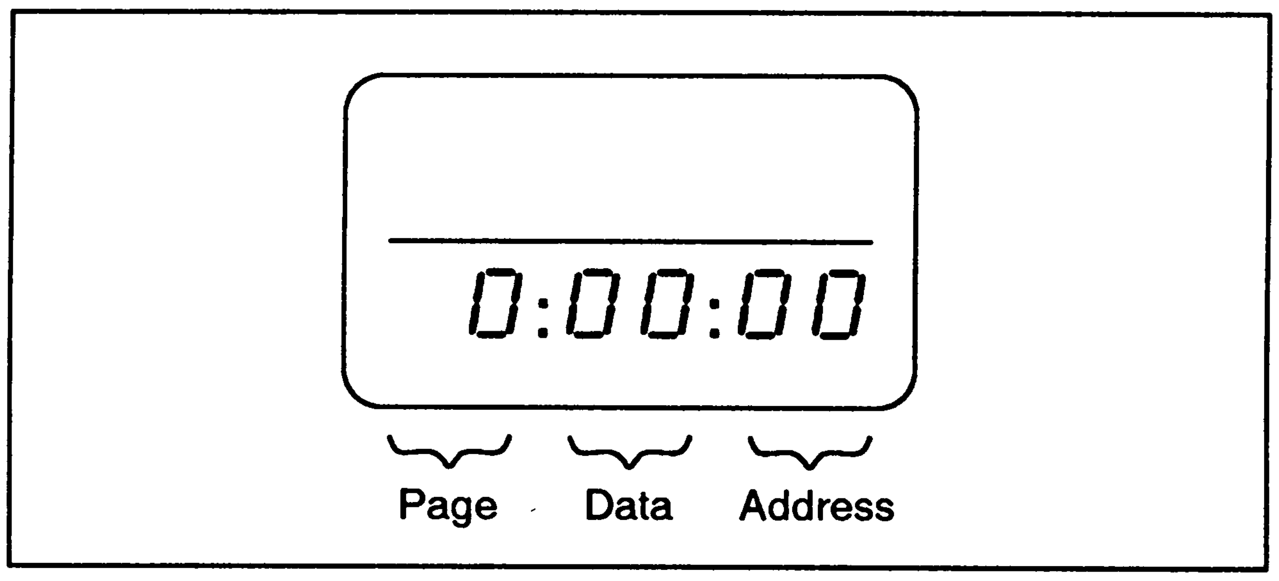


Fig. 7-1-6.

3) Operate the adjusting remote commander as follows.
   - Changing the page
     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH– button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
LCD Display	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 7-1-1.

   - Changing the address
     The address increases when the FF (►►) button is pressed, and decreases when the REW (◄◄) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)
     The data increases when the PLAY (►) button is pressed, and decreases when the STOP (■) button is pressed.
     There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data
     The PAUSE button must be pressed to write the adjustment data (F page) in the nonvolatile memory.
     (The new adjustment data will not be recorded in the nonvolatile memory if this step is not performed.)

4) Select page: 6, address: 00, and adjust the data to 01. Page F, and enables the camera section (Addresses 01 to BF of page F) to be adjusted.
5) After completing all adjustments, turn off the main power supply (6.3V) once.

2. Precautions upon using the adjusting remote commander

Mishandling of the adjusting remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.

1-1-5. Page F Address List

Note 1: The data already listed in the adjustment data memo column are fixed values.

Note 2: The adjustment data initial values are values just after executing "Page F Data Initialization" and "Page F Data Modification". They are different from the values after executing all adjustments.

Note 3: In some cases, data have been input to the page F addresses C0 to FF. This has no relation to the adjustments.

Address	Adjustment data	
	Initial value	Memo column
00	94	94
01	00	00
02	00	00
03	07	07
04	80	
05	80	
06	80	
07	80	
08	2D	
09	26	
0A	FA	
0B	F1	
0C	30	
0D	00	
0E	58	
0F	00	
10	E0	E0
11	8F	
12	6C	
13	36	
14	3C	
15	B6	
16	0D	
17	A3	
18	12	
19	8E	
1A	10	
1B	E2	
1C	0E	0E
1D	00	00
1E	80	
1F	80	
20	79	79
21	79	79
22	00	00

Table 7-1-2 (1).

Address	Adjustment data	
	Initial value	Memo column
23	59	59
24	43	43
25	B5	B5
26	23	23
27	1A	1A
28	A2	A2
29	0B	0B
2A	30	30
2B	50	50
2C	FF	FF
2D	02	02
2E	26	26
2F	27	27
30	08	08
31	00	00
32	45	45
33	68	68
34	02	02
35	35	35
36	04	04
37	00	00
38	93	93
39	84	84
3A	54	54
3B	20	20
3C	D0	D0
3D	02	02
3E	00	
3F	00	
40	00	
41	00	
42	00	
43	00	
44	00	
45	00	
46	00	
47	00	
48	00	
49	00	
4A	00	
4B	00	
4C	00	
4D	00	

Table 7-1-2 (2).

Address	Adjustment data	
	Initial value	Memo column
4E	00	00
4F	20	20
50	32	32
51	02	02
52	66	66
53	18	18
54	6B	6B
55	9F	9F
56	66	66
57	6C	6C
58	5C	5C
59	83	83
5A	67	67
5B	5C	5C
5C	5C	5C
5D	4A	4A
5E	20	20
5F	5C	5C
60	3C	3C
61	33	33
62	0C	0C
63	26	26
64	24	24
65	02	02
66	00	00
67	00	00
68	00	00
69	00	00
6A	00	00
6B	00	00
6C	00	00
6D	00	00
6E	00	00
6F	34	34
70	B0	B0
71	06	06
72	0F	0F
73	0F	0F
74	00	00
75	23	23
76	1B	1B
77	E0	E0
78	A0	A0
79	30	30

Table 7-1-2 (3).

Address	Adjustment data	
	Initial value	Memo column
7A	10	10
7B	50	50
7C	58	58
7D	88	88
7E	66	66
7F	46	46
80	8F	8F
81	13	13
82	30	30
83	60	60
84	70	70
85	80	80
86	A0	A0
87	C0	C0
88	70	70
89	78	78
8A	80	80
8B	90	90
8C	A0	A0
8D	1D	1D
8E	00	00
8F	00	00
90	00	00
91	77	77
92	00	00
93	FB	FB
94	02	02
95	32	32
96	6B	6B
97	8D	8D
98	A1	A1
99	30	30
9A	30	30
9B	21	21
9C	91	91
9D	72	72
9E	00	00
9F	00	00
A0	00	00
A1	00	00
A2	00	00
A3	00	00
A4	02	02
A5	80	80

Table 7-1-2 (4).

Address	Adjustment data	
	Initial value	Memo column
A6	00	00
A7	80	80
A8	00	00
A9	80	80
AA	00	00
AB	80	80
AC	00	00
AD	00	00
AE	02	02
AF	44	44
B0	3D	3D
B1	25	25
B2	3D	3D
B3	25	25
B4	12	12
B5	4B	4B
B6	00	00
B7	20	20
B8	00	00
B9	05	05
BA	00	00
BB	20	20
BC	80	80
BD	6E	6E
BE	32	32
BF	54	54
C0 to EF		
F0		
F1		
F2		
F3		
F4		
F5		
F6		
F7		
F8		
F9		
FA		
FB		
FC		
FD		
FE		
FF		

Table 7-1-2 (5).

1-1-6. Data Processing

The calculation of the DDS display and the adjusting remote commander display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Table 7-1-3. indicates the hexadecimal notation-the decimal notation calculation table.

Hexadecimal notation-Decimal notation

The lower digits of the hexadecimal notation The upper digits of the hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	② D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	80	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
① **B (b)**	176	177	178	179	180	180	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: ( ) indicate the adjusting remote control unit display.

(Example) In the case that the DDS display and the adjusting remote control unit display are BD (b d).
As the upper digit of the hexadecimal notation is B (b), and the lower digit is D (d), the intersection "189" of the ① and ② in the above table is the decimal notation to be calculated.

Table 7-1-3.

1-2. CAMERA SYSTEM ADJUSTMENT

1. Power Supply Voltage Check (DD-65 board)

Subject	Option
Measuring instrument	Digital voltmeter
D5V check	
Measurement point	Pins ㉙ of CN901
Specified value	4.9 ± 0.1 Vdc
D3.6V check	
Measurement point	Pins ㉑ and ㉒ of CN901
Specified value	3.6 ± 0.1 Vdc
CAM 5V check	
Measurement point	Pins ㉕ and ㉖ of CN901
Specified value	4.85 ± 0.1 Vdc
CAM 15V check	
Measurement point	Pin ㉗ of CN901
Specified value	15 ± 0.3 Vdc
CAM –9V check	
Measurement point	Pin ㉛ of CN901
Specified value	$-8.5^{+0.25}_{-0.4}$ Vdc

Checking method:

1) Check that each power supply voltage satisfies the specified value.

2. Page F Data Initialization

Note: It is necessary to perform all adjustments of the camera section from the beginning again if the data of page F has been initialized.

Initializing method:

1) Set data: 01 to page: 6, address: 00.
2) Check that the data of page: 6, address: 11 is 00.
3) Set data: 2D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: 6, address: 11 is 01.
5) Set data: 00 to page: 6, address: 01. and press the PAUSE button of the adjusting remote commander.
6) After performing "Page F data modification", perform all the adjustments of the camera section (page F).

3. Page F Data Modification 1

When the page F data is initialized, change the data by manual input.

Note 1: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote commander every time the new data is set.

Note 2: When changing address: 00, set the data of page: 6, address: 00 to 80.

Address	Data
00	94
1C	0E
27	1A
28	A2
2A	30
2B	50
2D	02
2E	26
2F	27
30	08
32	45
35	35
36	04
38	93
39	84
3A	54
3B	20
3C	D0
3D	02
50	32
70	B0
77	E0
9C	91
A4	02
BC	80
BD	6E
BE	32
BF	54

Table 7-1-4.

4. 28 MHz Original Oscillation Adjustment (VC-142 board)

Adjust the 28 MHz oscillation of the synchronization clock.
If the oscillation is not 28 MHz, the period will be inaccurate or the image will not be in color.

Subject	Not required
Measurement Point	TP709 (Pin ⑫ of IC702)
Measuring Instrument	Frequency counter
Adjusting Element	CT701
Specified Value	14318181 ± 71 Hz

Adjusting method:

1) Use CT701 to adjust the oscillation frequency to 14318181 ± 71 Hz.

5. V SUB Adjustment

Set the CCD imager V SUB voltage to the voltage specified for the imager.

Subject	Not required
Adjustment Page	F
Adjustment Address	04

Adjusting Method:

1) Read the V SUB voltage code of the CCD imager.
   Obtain the corresponding V SUB data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the V SUB data to page: F, address: 04.
4) Press the PAUSE button of the adjusting remote commander.

V SUB			**V SUB**		
Voltage Code	**Data**	**Voltage (Vdc) *1**	**Voltage Code**	**Data**	**Voltage (Vdc) *1**
e	6F	9.0	q	AD	14.0
f	75	9.5	r	B3	14.5
g	7B	10.0	s	B9	15.0
h	82	10.5	t	C0	15.5
j	88	11.0	u	C6	16.0
k	8E	11.5	v	CC	16.5
l	94	12.0	w	D2	17.0
m	9A	12.5	x	D8	17.5
n	A1	13.0	y	DF	18.0
p	A7	13.5	z	E5	18.5

*1: The V SUB voltages (TP703) given are reference values.

6. VRG Adjustment

Set the CCD imager V RG voltage to the voltage specified for the imager.

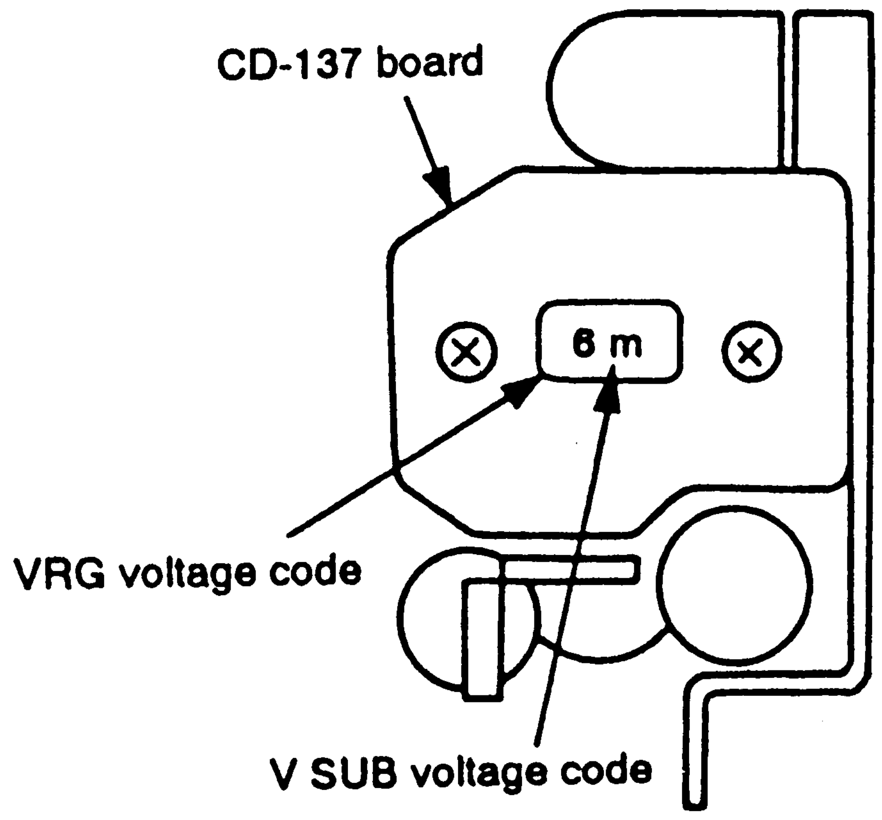
Subject	Not required
Adjustment Page	F
Adjustment Address	05

Adjusting Method:

1) Read the VRG voltage code of the CCD imager.
   Obtain the corresponding VRG data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the VRG data to page: F, address: 05.
4) Press the PAUSE button of the adjusting remote commander.

VRG		
Voltage Code	**Data**	**Voltage (Vdc) *2**
1	33	1.0
2	4E	1.5
3	69	2.0
4	84	2.5
5	9F	3.0
6	BA	3.5
7	D5	4.0

*2: The VRG voltages (TP707) given are reference values.



(Example) When "6m" is displayed:
The V SUB voltage code is "m" and therefore the V SUB data will be "9A".
The VRG voltage code is "6" and therefore the VRG data will be "BA".

Fig. 7-1-7.

7. HALL Adjustment

For detecting the position of the lens iris, adjust the hall AMP gain and hall offset.

Subject	Not required
Measurement Point	DDS display of LCD or monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	06, 07
Specified Value	32 to 36 during IRIS OPEN B4 to B8 during IRIS CLOSE

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 01 to page: 1, address: 00.
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 03 to page: 6, address: 02.
5) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 80 to page: F, address: 07, and press the PAUSE button of the adjusting remote commander.
7) Set data: 40 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
8) Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the monitor TV display), and this data is named W_2.
9) Set data: 30 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
10) Read the DDS display data, and this data is named W_1.
11) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
12) Read the DDS display data, and this data is named K_1.
13) Set data: 40 to page: F, address: 06, and press the PAUSE button.
14) Read the DDS display data, and this data is named K_2.
15) Convert W_1, W_2, K_1, K_2 to decimal notation, and obtain W_1', W_2', K_1', K_2'. (Refer to Table 7-1-3. "Hexadecimal notation-decimal notation conversion table".)
16) Calculate X_1' using the following equations (decimal notation calculation).

$$A'=W_2'+K_1'-W_1'-K_2' \cdots\cdots\cdots \text{Equation 1}$$

$$B'=W_1'-K_1' \cdots\cdots\cdots \text{Equation 2}$$

$$X_1'=\frac{2080+(48\times A')-(16\times B')}{A'} \cdots\cdots\cdots \text{Equation 3}$$

17) Convert X_1' to hexadecimal notation, and obtain X_1. (Round off to one decimal place)
18) Set data: X_1 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
19) Change the data of page: F, address: 07, and adjust the DDS display data to "34".
20) Press the PAUSE button of the adjusting remote commander.
21) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
22) Read the DDS display data, and this data is named W_0. If W_0 lies within the "B4" to "B8" range, perform "Processing after completing adjustments". If it lies outside the range, perform the following adjustments.
23) Convert W_0 to hexadecimal notation, and obtain W_0'.
24) Calculate X_2' using the following equations (decimal notation calculation).

$$C'=W_0'-B'-52 \cdots\cdots\cdots \text{Equation 4}$$

$$X_2'=\frac{(130-B')\times(X_1'-48)+48\times C'}{C'} \cdots\cdots\cdots \text{Equation 5}$$

(X_1' and B' are values obtained from equations 2 and3)

25) Convert X_2' to hexadecimal notation and obtain X_2. (Round off to one decimal place)
26) Set data X_2 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
27) Change the data of page: F, address: 07, and adjust the DDS display data to "B6".
28) Press the PAUSE button of the adjusting remote commander.
29) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
30) Check that the DDS display data lies within the "32" to "36" range.

Processing after Completing Adjustments

1) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

8. Flange Back Adjustment

The flange back adjustment for the inner focus lens is performed automatically.

Subject	Chart for flange back adjustment (2000 ± 5 mm from the front side of the lens Luminance: 300 ± 50 lux)
Measurement Point	Check the operations on the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	16, 17, 18, 19, 1A, 1B

Adjusting method:

1) Check that the flange back adjustment chart center and the exposure display center coincide at both zoom lens TELE end and WIDE end.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 21 is 00.
4) Check that the page: F, address: 16 to 1B data is at the initial value. (Refer to Table 7-1-4. "Page F address list")
5) Set data: 13 to page: 6, address: 01 and press the PAUSE button of the adjusting remote commander.
6) Set data: 15 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (The adjustment data is automatically input to page: F, addresses: 16 to 1B.)
7) Check that the data of page: 6, address: 21 is 01.
   (Display indicating flange back adjustment completion)

Processing after completing adjustments

1) Turn off the main power supply (6.3V).

9. Flange Back Check

Subject	Siemens star (2m from the front of the lens)
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Specified Value	Focused at the TELE end and WIDE end.

Checking method:

1) Place the Siemens star 2m from the front of the lens.
2) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appears on the image.
3) Set data: 02 to page: 6, address: 32.
4) Set data: 01 to page: 6, address: 33.
5) Shoot the siemens star with the zoom TELE end.
6) Turn the auto focus on.
7) Check that the lens is focused. (Note 2)
8) Turn the auto focus off, or set data: 01 to page: 6, address: 25.
9) Shoot the siemens star with the zoom WIDE end.
10) Check that the lens is focused.

Note: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on page A of the adjusting remote commander.

1) Set data: 0C to page: 6, address: 02.
2) Page A shows the state of the focus.

A : 00 : XX
→ (Odd: Focused
Even: Unfocused)

Processing after compleating adjustments

1) Set data: 00 to page: 6, address: 02.
2) Set data: 00 to page: 6, address: 25.
3) Set data: 00 to page: 6, address: 32.
4) Set data: 00 to page: 6, address: 33.

10. SYNC Level Check (VC-142 board)

Subject	Not required
Measurement Point	TP607 (Emitter of Q607)
Measuring Instrument	Oscilloscope
Specified Value	A=140 ± 10 mV

Adjusting method:

1) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Check that the SYNC level (A) satisfies the specified value.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

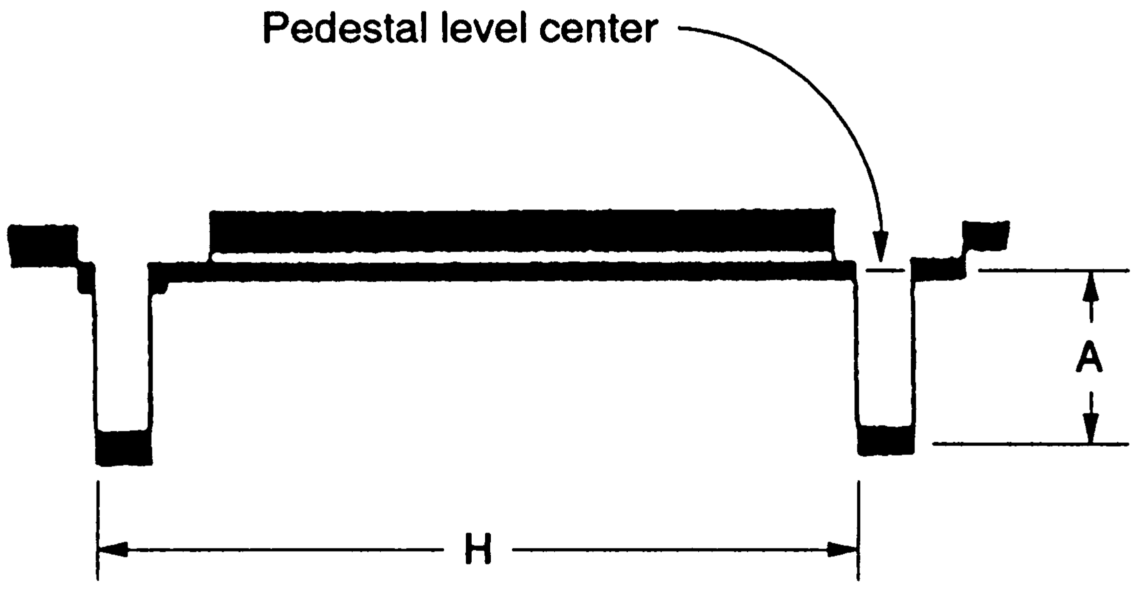


Fig. 7-1-8.

11. BURST Level Check (VC-142 board)

Subject	Not required
Measurement Point	TP609 (Emitter of Q606)
Measuring Instrument	Oscilloscope
Specified Value	A=140 ± 15 mVp-p

Adjusting method:

1) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Check that the Burst level (A) satisfies the specified value.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

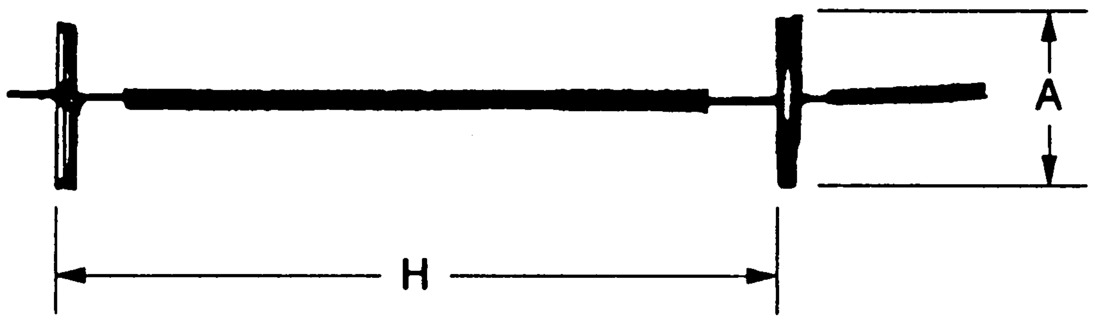


Fig. 7-1-9.

12. Picture Frame Setting

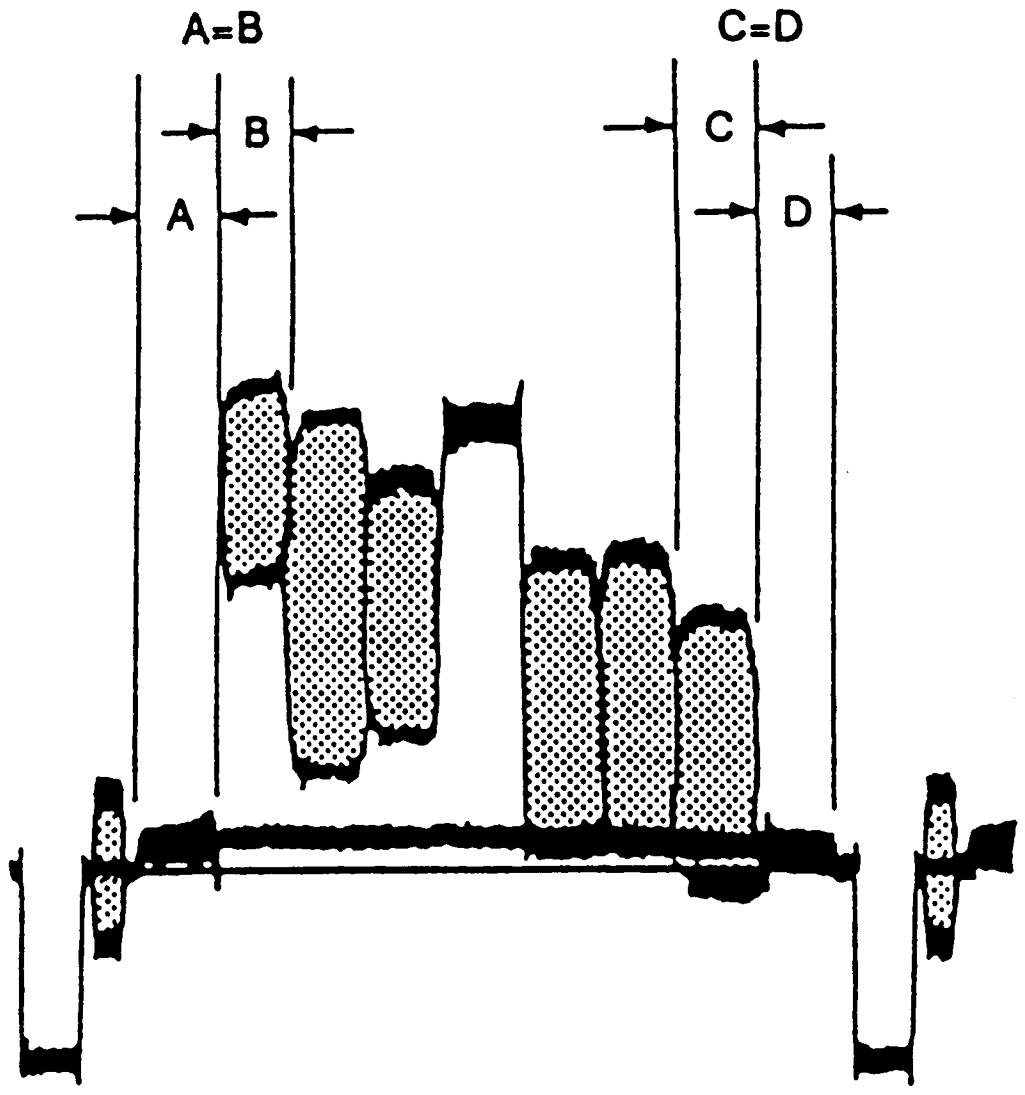
Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Oscilloscope and TV monitor.
Specified Value	A=B, C=D, t=0 ± 0.1 msec

Setting method:

1) Turn the auto focus off.
2) Adjust the focus.
3) Adjust the zoom and the camera direction, and set to the specified position.
4) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "color bar chart standard picture frame".

Check on the oscilloscope

1. horizontal period



2. Vertical period

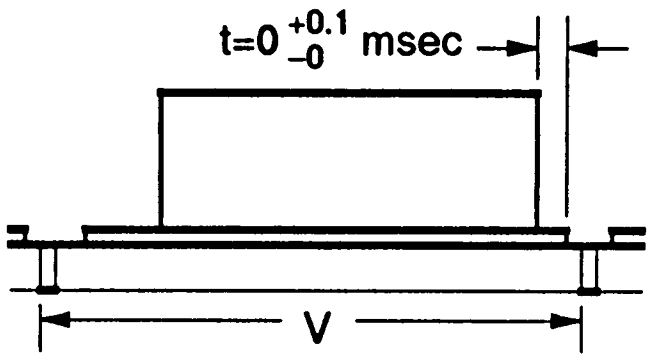


Fig. 7-1-10.

Check on the TV monitor

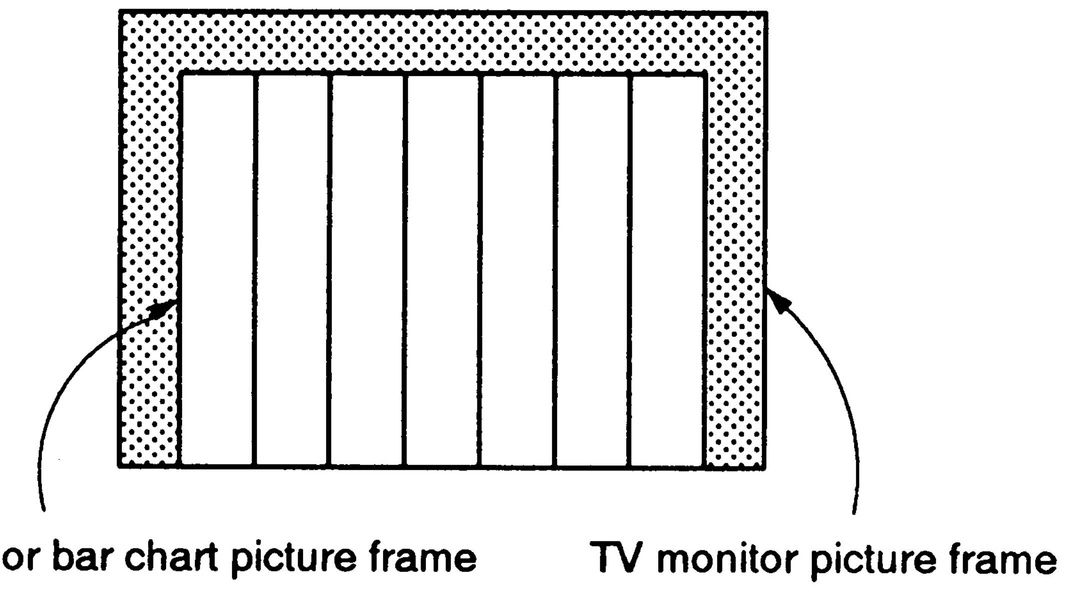


Fig. 7-1-11.

13. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that the proper color reproduction is produced.

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	08, 09, 0A, 0B
Specified Value	All color luminance points should settle within each color reproduction frame.

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 00 to page: 6, address: 03.
3) Set data: F1 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
4) Set data: 12 to page: F, address: 50, and press the PAUSE button of the adjusting remote commander.
5) Set data: C6 to page: F, address: 63, and press the PAUSE button of the adjusting remote commander.
6) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
7) Change the data of addresses 08, 09, 0A and 0B of page: F, and settle each color luminance point in each color reproduction frame.
   Note 1: Be sure to press the PAUSE button of the adjusting remote commander before changing the addresses.
   If not, the new data will not be written to the memory.
8) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: E0 to page: F, address: 10 and press the PAUSE button of the adjusting remote commander.
2) Set data: 32 to page: F, address: 50, and press the PAUSE button of the adjusting remote commander.
3) Set data: 26 to page: F, address: 63, and press the PAUSE button of the adjusting remote commander.
4) Set data: 10 to page: 6, address: 03.

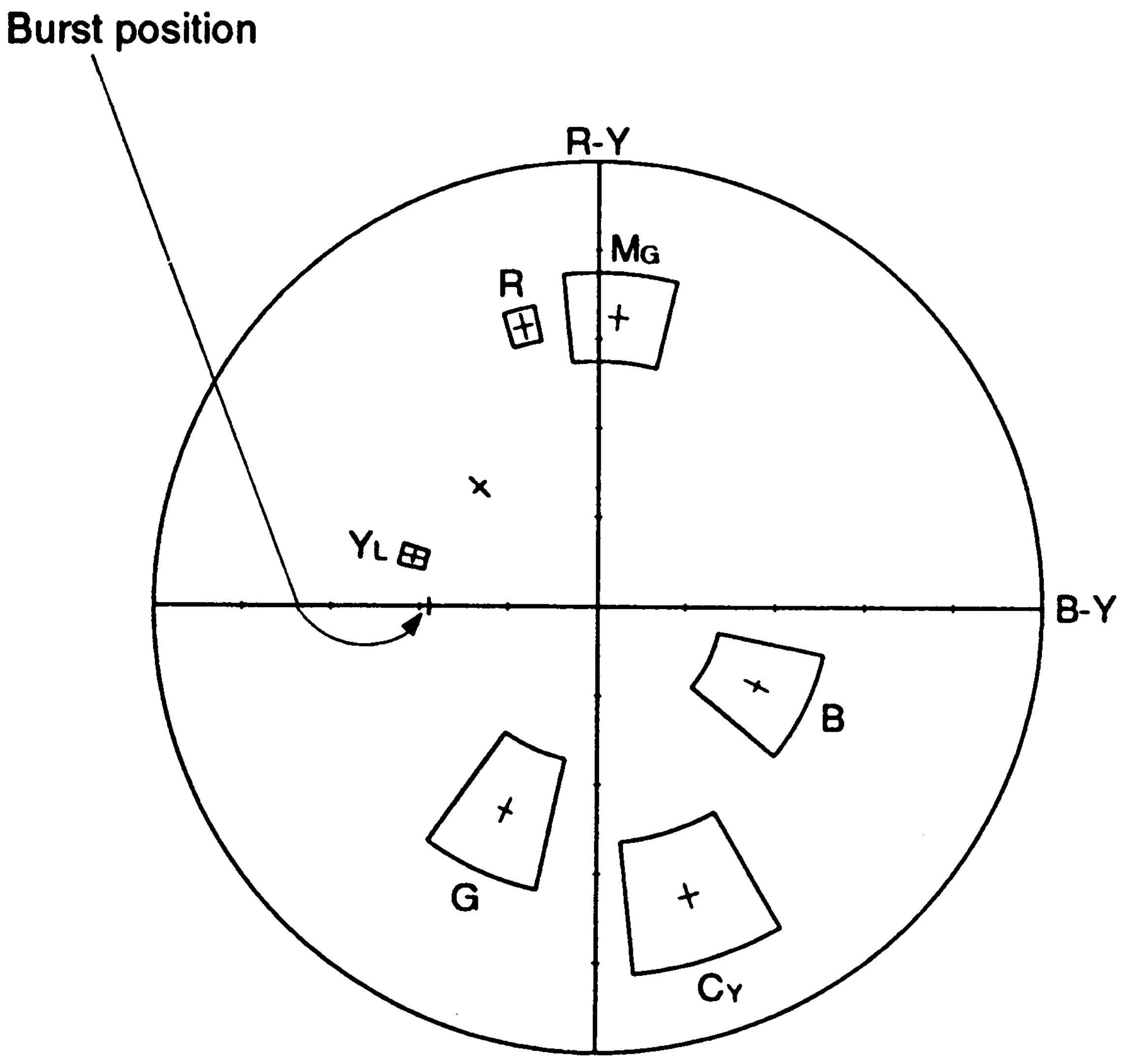


Fig. 7-1-12.

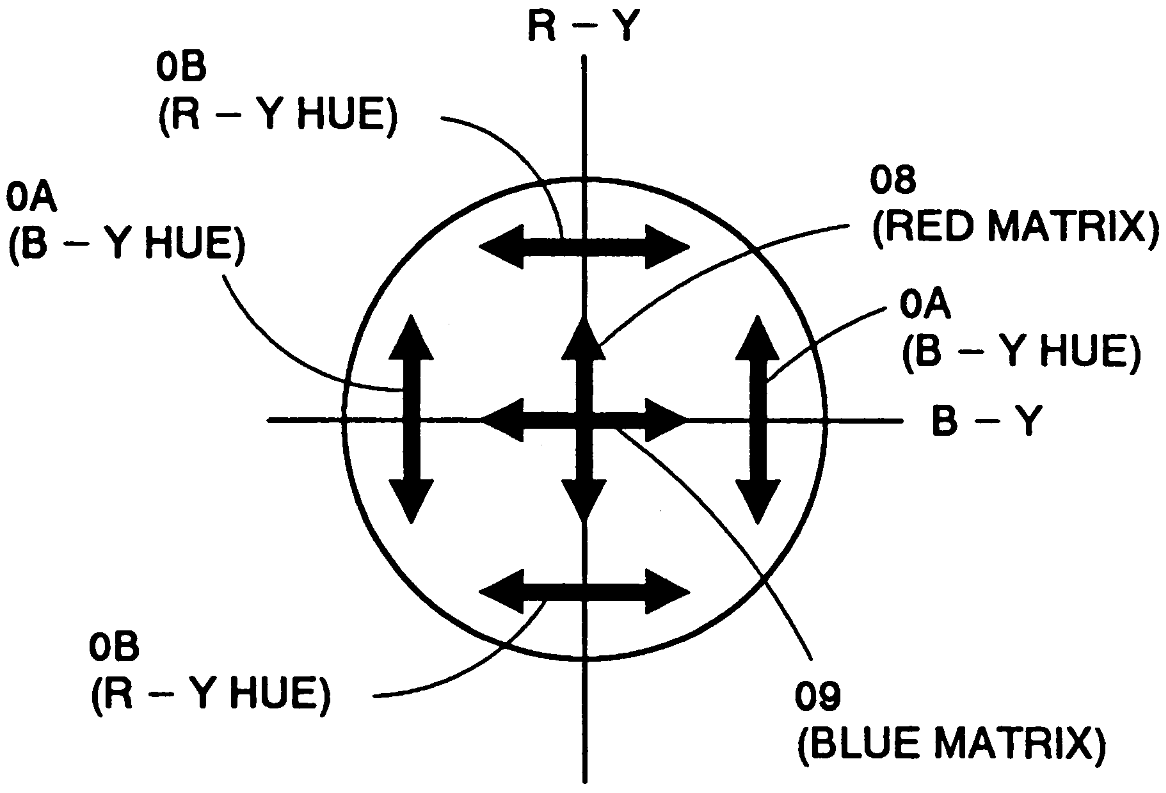


Fig. 7-1-13. Direction of the Movements of the Adjustment Address and Luminance Point

14. IRIS IN/OUT Adjustment

For the unit to judge if the white balance is indoors or outdoors, measure the light level and write it in the EEPROM.
If the level is not correct, the white balance will not be accurate.

Subject	White pattern
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	13, 14

Adjusting method:

1) Set data: 01 to page: 6, address: 00
2) Set data: 01 to page: 1, address: 00
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 0E to page: 6, address: 02.
5) Set data: 0B to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Read the DDS display data (Note 1), and take the upper two digits as D_1 and the lower two as D_2.
7) Convert D_1 to a decimal number and obtain D_1'. (Refer to Table 7-1-3. "Hexadecimal Notation-Decimal Notation Conversion Table".)
8) Calculate D_3' using the following equations.
   (Equations 1 and 2 are for decimal notation calculation)
   When $D_2 \geqq D0$
   $D_3'=D_1'-21$ ··································Equation 1
   When $D_2 < D0$
   $D_3'=D_1'-22$ ··································Equation 2
9) Convert D_3' to a hexadecimal number and obtain D_3.
10) Set D_3 to page: F, address: 13, and press the PAUSE button of the adjusting remote commander.
11) Set data: 09 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
12) Read the DDS display data (Note 1), and take the upper two digits as D_4 and the lower two as D_5.
13) Convert D_4 to a decimal number and obtain D_4'. (Refer to Table 7-1-3. "Hexadecimal Notation-Decimal Notation Conversion Table".)
14) Calculate D_6' using the following equations.
   (Equations 3 and 4 are for decimal notation calculation)
   When $D_5 \geqq F0$
   $D_6'=D_4'-13$ ··Equation 3
   When $D_5 < F0$
   $D_6'=D_4'-14$ ··Equation 4
15) Convert D_6' to a hexadecimal number and obtain D_6.
16) Set D_6 to page: F, address: 14, and press the PAUSE button of the adjusting remote commander.

Note 1: The right four digits of the display data at the right bottom side of the EVF and monitor TV is the LIGHT LEVEL data. If the lower digits change severely and cannot be read, record it on a tape once, play it back by frame feeding, and obtain the average value.

Processing after Completing Adjustments

1) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 1, address: 00.
3) Set data: 00 to page: 6, address: 00, and press the PAUSE button of the adjusting remote commander.
4) Set data: 00 to page: 6, address: 02.
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

15. MAX GAIN Adjustment (VC-142 board)

Setting the minimum illumination.
If it is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	White pattern standard picture frame
Measurement Point	TP607 (Emitter of Q607)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	15
Specified Value	A=240 ± 10 mV

Adjusting method:
1) Set data: 01 to page: 6, address: 00.
2) Set data: 19 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
3) Change the data of page: F, address: 15, and adjust so that the Y OUT signal level (A) becomes the specified value.
   Note: The data of address: 15 should be 70 to FF.
4) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments
1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

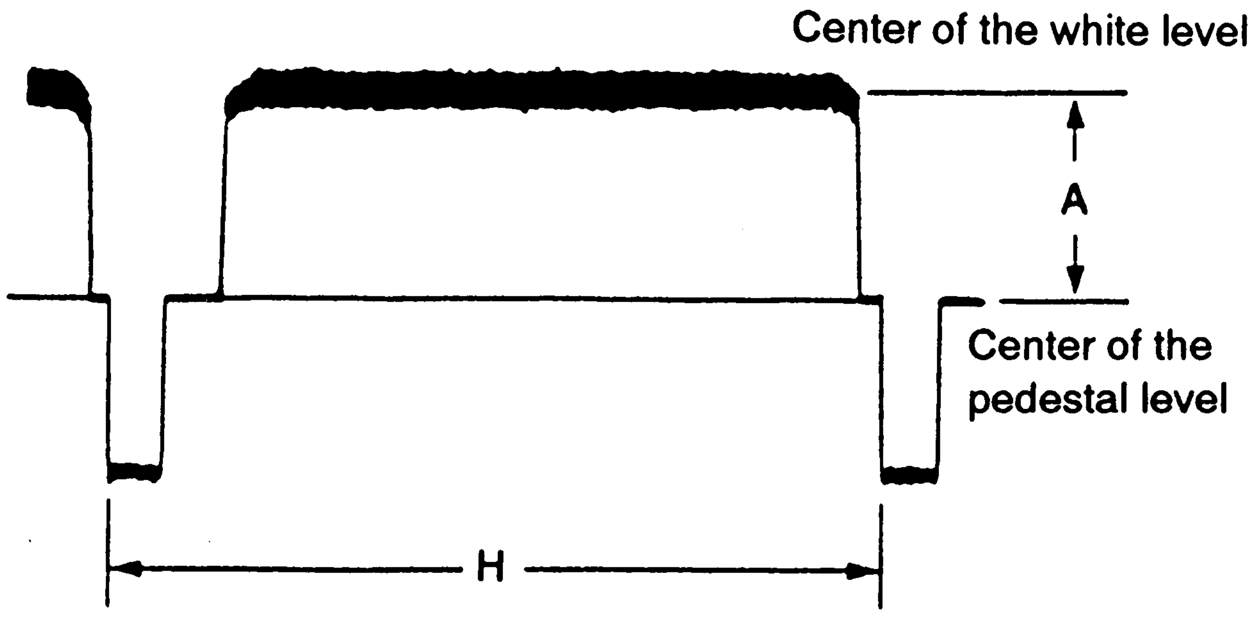


Fig. 7-1-14.

16. Auto White Balance Standard Data Input

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	0C, 0D, 0E, 0F

Adjusting method:
1) Turn the power of the unit OFF/ON.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 11 is 00.
4) Check that the data of page: 6, address: 03 is 10.
5) Wait for 2 seconds.
6) Set data: 11 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
7) Set data: 0D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (When the standard data is taken in, the data will be automatically input to addresses 0C to 0F of page F.)
8) Check that the data of page: 6, address: 11 is 01.

Processing after completing adjustments
1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

17. Auto White Balance Adjustment

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	Check with the DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	11, 12
Specified Value	R ratio: 2B40 to 2BC0 B ratio: 5E00 to 5F00

Adjusting method:
1) Place the C14 filter for color temperature correction on the lens.
2) Set data: 01 to page: 1, address: 00.
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 01 to page: 6, address: 00.
5) Set data: D0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
6) Set data: 04 to page: 6, address: 02.
7) Change the data of page: F, address: 11, and adjust the average value of the DDS display data (the display data at the bottom right of the EVF or the TV monitor) to the R ratio specified value.
8) Press the PAUSE button of the adjusting remote commander.
9) Set data: 05 to page: 6, address: 02.
10) Change the data of page: F, address: 12, and adjust the average value of the DDS display data to the B ratio specified value.
11) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments
1) Set data: E0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 6, address: 02.
4) Set data: 00 to page: 1, address: 00.

18. White Balance Check

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.3
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Specified Value	Fig. 7-1-15. A to C

Checking method:

1) Check that the lens is not covered with either filter.
2) Set data: 01 to page: 6, address: 00.
3) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the center of the white luminance point is within the circle shown in Fig. 7-1-15.A.
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 23 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
7) Place the C14 filter on the lens.
8) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-15. B.
9) Remove the C14 filter, and place the ND filter 1.3 (1.0+0.3) on the lens.
10) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-15. C.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 00, and press the PAUSE button.

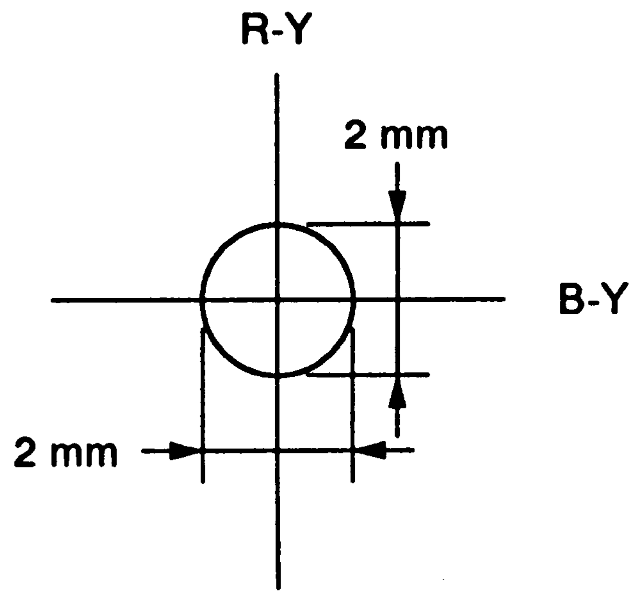


Fig. 7-1-15. A

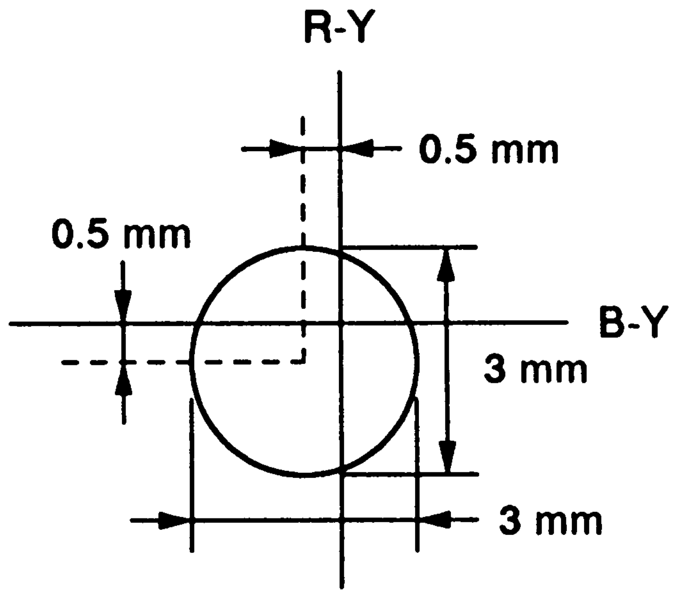


Fig. 7-1-15. B

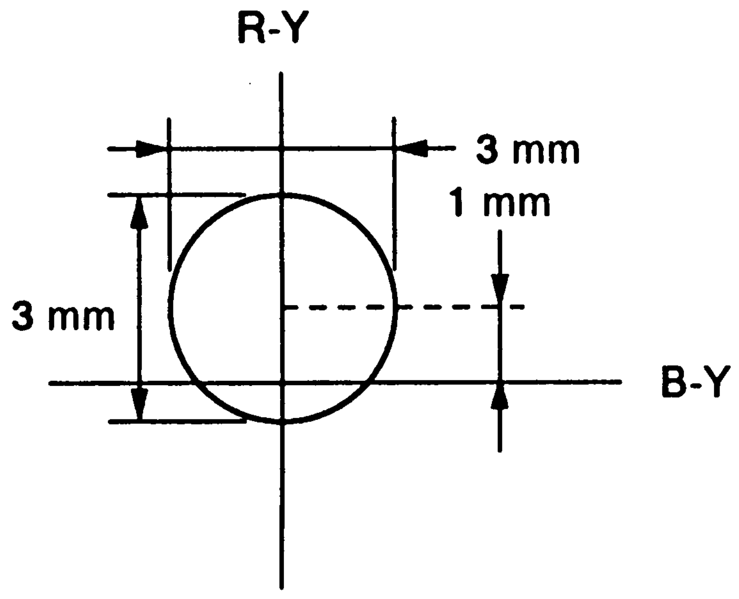


Fig. 7-1-15. C

19. Movement Correction Adjustment

Perform the movement correction adjustment only when the angular velocity sensor has been replaced. It need not be performed when the microprocessor, circuits, etc. are damaged. In such cases, check operations only.

Subject	Arbitrary
Measurement Point	Video output pin
Measuring Instrument	TV monitor, oscilloscope
Adjustment Page	F
Adjustment Address	IE, IF
Specified Value	Horizontal residual vibration ≦ 1.5 μsec Vertical residual vibration ≦ 0.75 msec.

Precautions for Replacing Parts

There are two types of repair parts-ENC05DA and ENC05DB. Replace with the same type as the damaged sensor. If the incorrect type is used, the image may move up and down or left and right during movement correction operations.

Therefore be sure to check that the correct one is used. After replacement, re-adjust according to the adjusting method.

Precautions for Angular Velocity Sensor

The sensor incorporates a high sensitivity oscillator. Handle with care as if the sensor is dropped, the oscillator will lose its balance and cause operations to be performed incorrectly.

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Read the sensor sensitivity on the SE691 board of the FP-49 board. (Note 1)
3) Obtain D1′ using the following equation (decimal calculation).
   D1′=(1.03 × 82)/sensor sensitivity
4) After rounding D1′ to a whole number, convert it to a hexadecimal number and take it as D1.
   (See Table 7-1-3 "Decimal-Hexadecimal Conversion".)
5) Set D1 to page: F, address: 1E. Press the PAUSE button of the adjusting remote control unit.
6) Read the sensor sensitivity on the SE692 board of the FP-49 board. (Note 1)
7) Obtain D2′ using the following equation (decimal calculation).
   D2′=(0.98 × 84)/sensor sensitivity
8) After rounding D2′ to a whole number, convert it to a hexadecimal number and take it as D2.
   (See Table 7-1-3 "Decimal-Hexadecimal Conversion".)
9) Set D2 to page: F, address: 1F. Press the PAUSE button of the adjusting remote control unit.
10) Shoot any subject at maximum TELE and check that the movement correction operation is normal.

Note 1: The sensor sensitivity is labeled only on repair parts.

Procedure after Adjustment

1) Set data: 00 to page: 6, address: 00.

20. VIDEO OUT Level Check

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal (Terminated at 75 Ω)
Measuring Instrument	Oscilloscope
Specified Value	Y level=660 ± 40 mV SYNC level=285 ± 20 mV BURST level=285 ± 20 mV

Checking method:

1) Check that the Y level, SYNC level and BURST level satisfy the specified values.

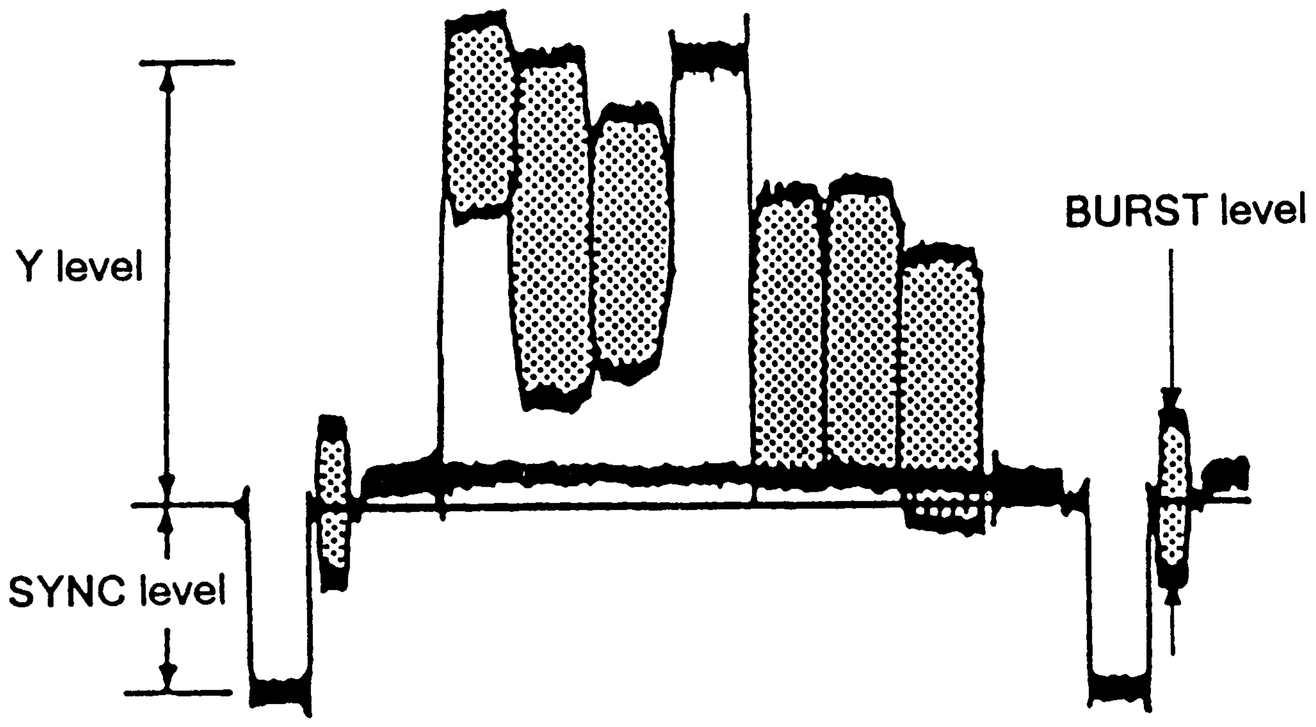


Fig. 7-1-16.

1-3. COLOR ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS

Note 1: The backlight (fluorescent tube) is driven by a 800 Vp-p, 16 kHz AC power supply.
Therefore, be careful not to touch the backlight holder as you will receive an electric shock..

Note 2: When replacing the LCD unit, ensure there will be no damages by static electricity.

[Adjusting connector]

Most measuring points for adjusting the view-finder are concentrated at CN801 of the VF-68 board. Connect the measuring equipments via the measuring pin tool. The following table lists the pin numbers and signal names of CN801.

Pin No.	Signal Name	Pin No.	Signal Name
1	LC COM	2	EVF GND
3	G OUT	4	13.5V
5	SELFR	6	12V
7	R OUT	8	B OUT
9	BRIGHT	10	PCO

Table 7-1-5.

Measuring pin tool Parts Code: J-6082-192-A

[Positions of RVs during adjustments]

Unless specified otherwise, set RVs to the following positions and adjust.

RV953 (BRIGHT)········ Refer to "BRIGHT Adjustment"
RV954 (COLOR)········· Mechanical center
RV955 (HUE)·· 20° ± 15° from the mechanical center in the counterclockwise (↺).

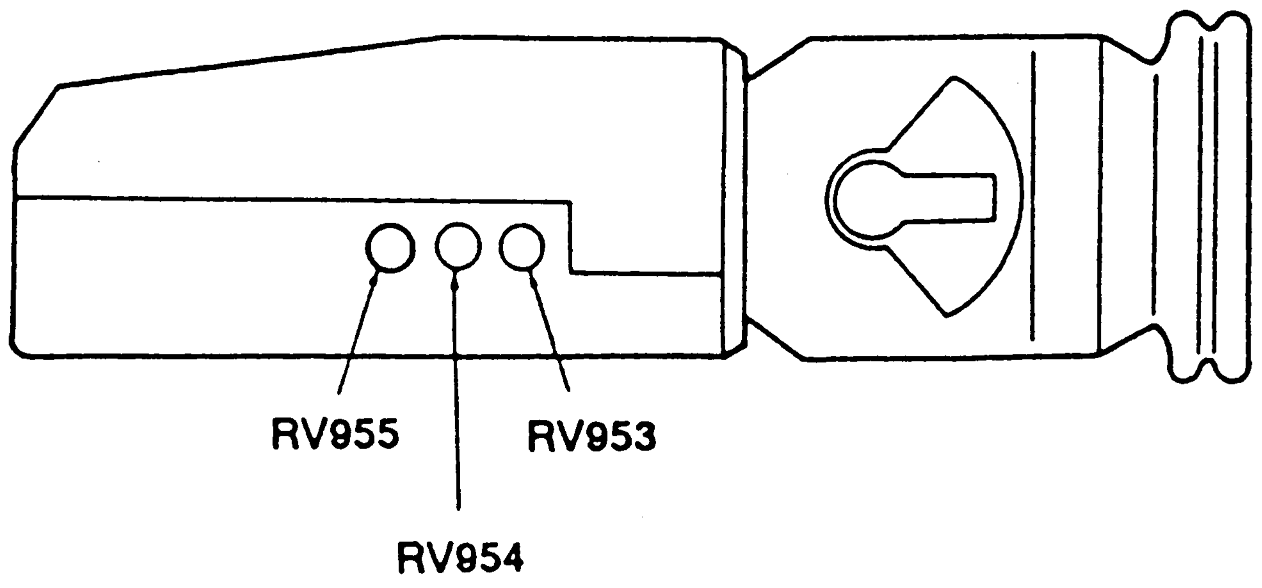


Fig. 7-1-17.

[Power Supply Voltage]

Adjust the power supply voltage for the battery pin so that Pin ① (EVF UNREG) of CN951 of the VF-69 board becomes 6.0 ± 0.1 Vdc.

[Connecting the Pattern Generator]

Remove the VC-142 board, and connect the pattern generator to Pin ㉚ of IC 201 on VS-111 board via a attenuater.
For further details of how to connect the pattern generator, refer to "3-1-3. Connecting the Equipments" in "7-3. VIDEO SECTION ADJUSTMENTS."

[Video Input Signal for Adjusting]

If the signal column specifies "Color bar signal whose chroma signal and burst signal are turned off", input a color bar signal whose chroma signal and burst signal have been turned off to the video input pin as the video input signal for adjusting. Check that the signal level of Pin ⑤ of CN951 of the VF-69 board is 0.9 ± 0.12 Vp-p before adjusting.

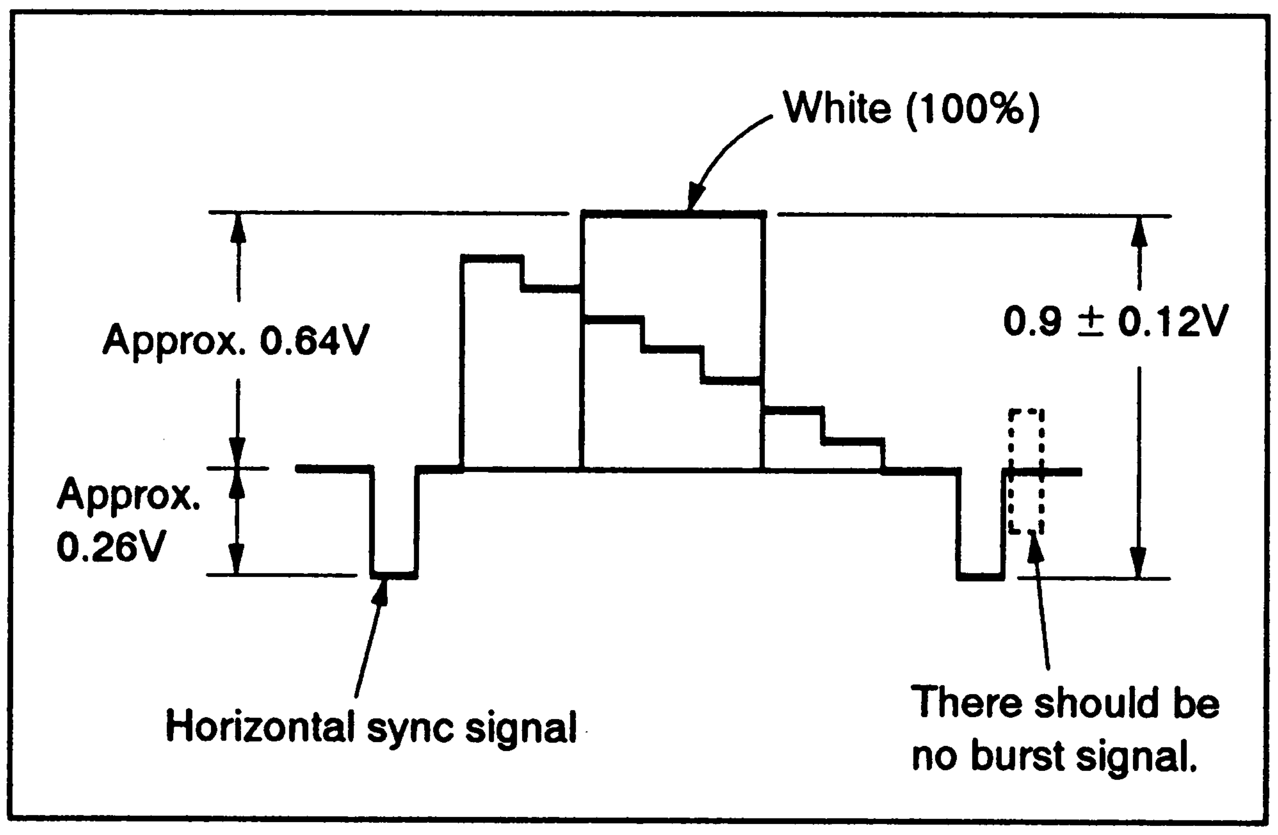


Fig. 7-1-18. Color bar signal turning off chroma and burst signals

1. Current consumption adjustment (VF-69 board)

Adjust the luminance and color temperature of the back light.
If these are not correct, the image will be brighter or darker than normal.

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Remove L953 and measure +: Pin ① of CN951 –: ⊕ pin of C958
Measuring Instrument	Ammeter
Adjustment Element	RV951
Specified Value	85 ± 5 mA

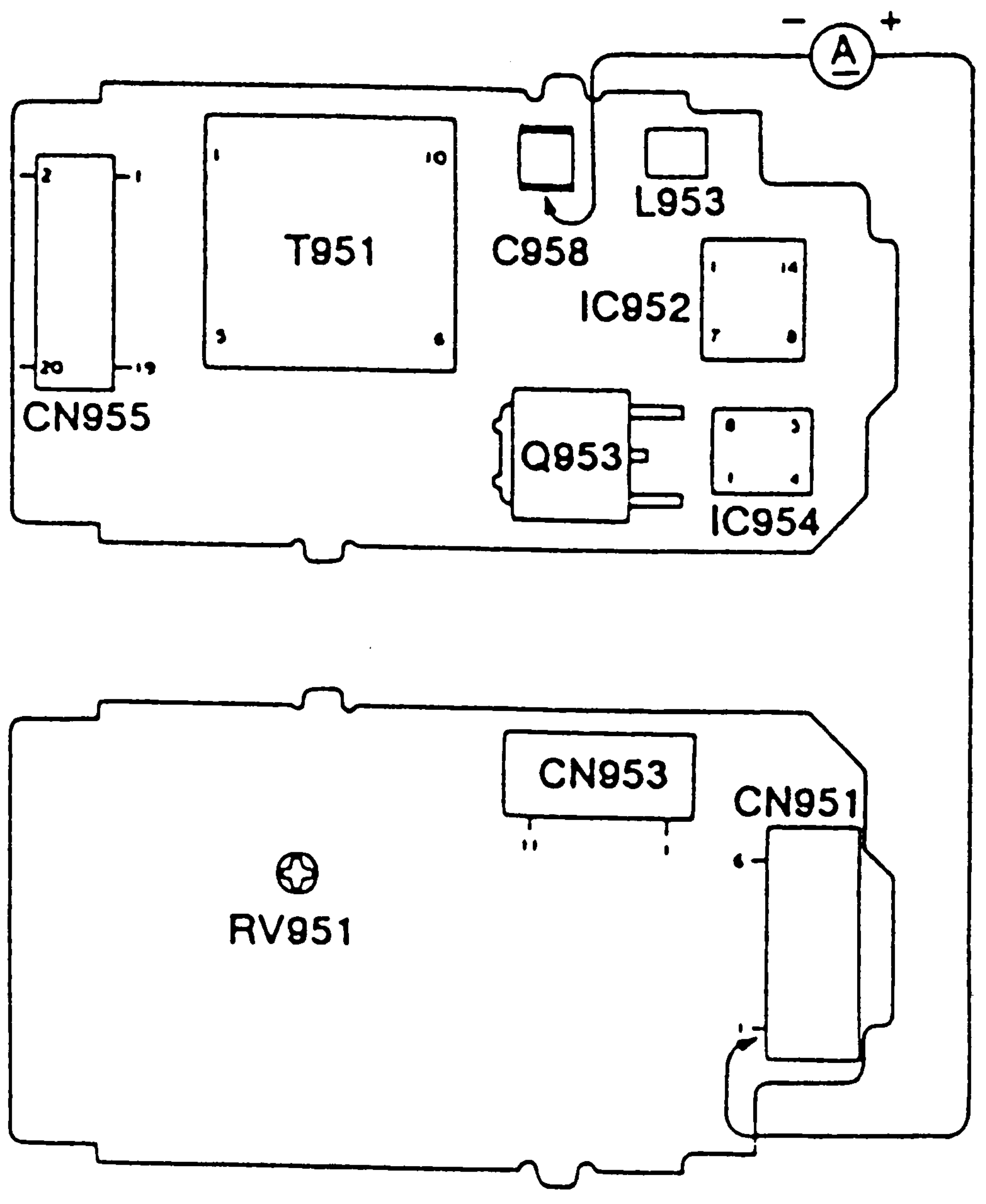
Note 1: Adjust within 30 secs. after the power supply has been turned on.

Note 2: After adjusting, connect L953.

Adjusting method:

1. Check that the voltage of Pin ① of CN951 is 6.0 ± 0.1 Vdc.
2. Adjust the current consumption to 85 ± 5 mA with RV951.

VF-69 board Component side



VF-69 board Conductor side

Fig. 7-1-19.

2. Power supply voltage check (VF-68 Board)

Mode	Stop
Measuring Instrument	Digital voltmeter
+12V check	
Measurement Point	Pin ⑥ of CN801 (12V)
Specified Value	+11.6 ± 0.2 Vdc
+13.5V check	
Measurement Point	Pin ④ of CN801 (13.5V)
Specified Value	+13.5 ± 0.3 Vdc

Checking Method:

1. Check that the UNREG power supply voltage (Pin ① of VF-69 board CN951) of CN951 is 6.0 ± 0.1 Vdc.
2. Check that each power supply voltage satisfies the specified value.

3. VCO adjustment (VF-68 Board)

Set the free running frequency of the VCO.
If it is not correct, the image will waver.

Mode	Stop
Signal	Color bar
Measurement Point	Pin ⑩ of CN801 (PCO)
Measuring Instrument	Oscilloscope (DC range)
Adjustment Element	RV804
Specified Value	A=2.8 ± 0.1V

Adjusting method:

1. Check the GND level of the oscilloscope.
2. Adjust the PCO voltage (A) to the specified value with RV804.

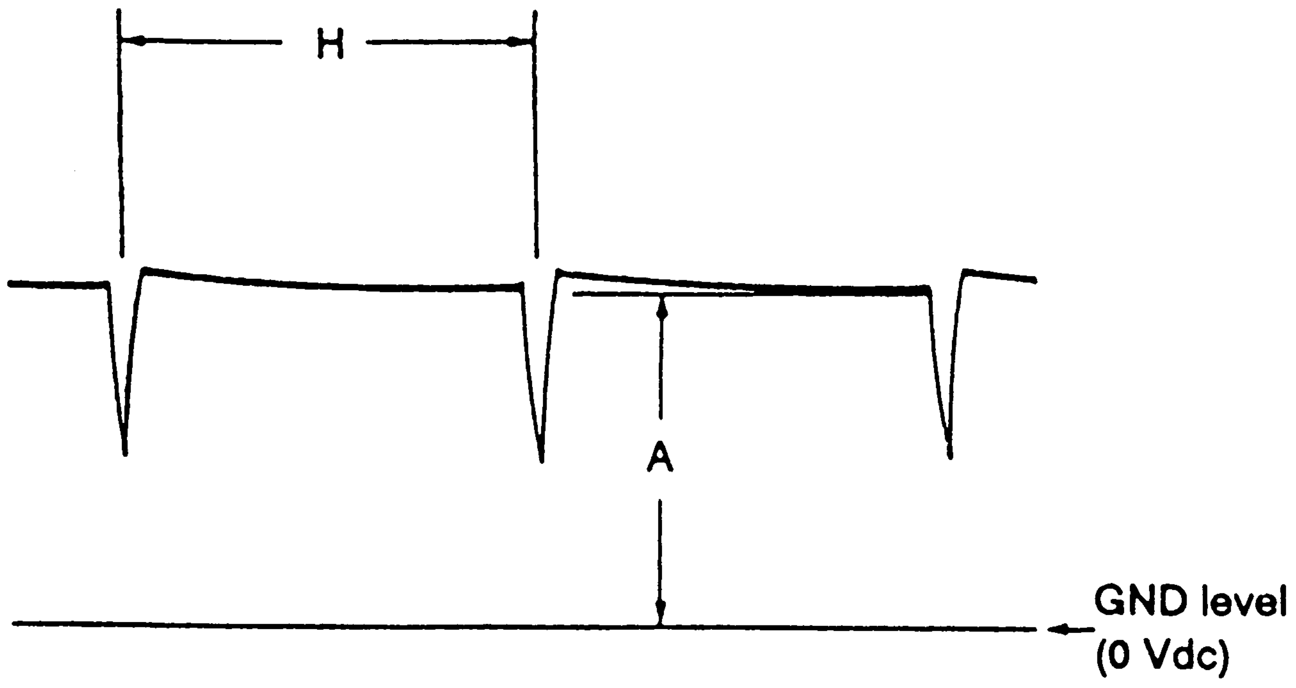
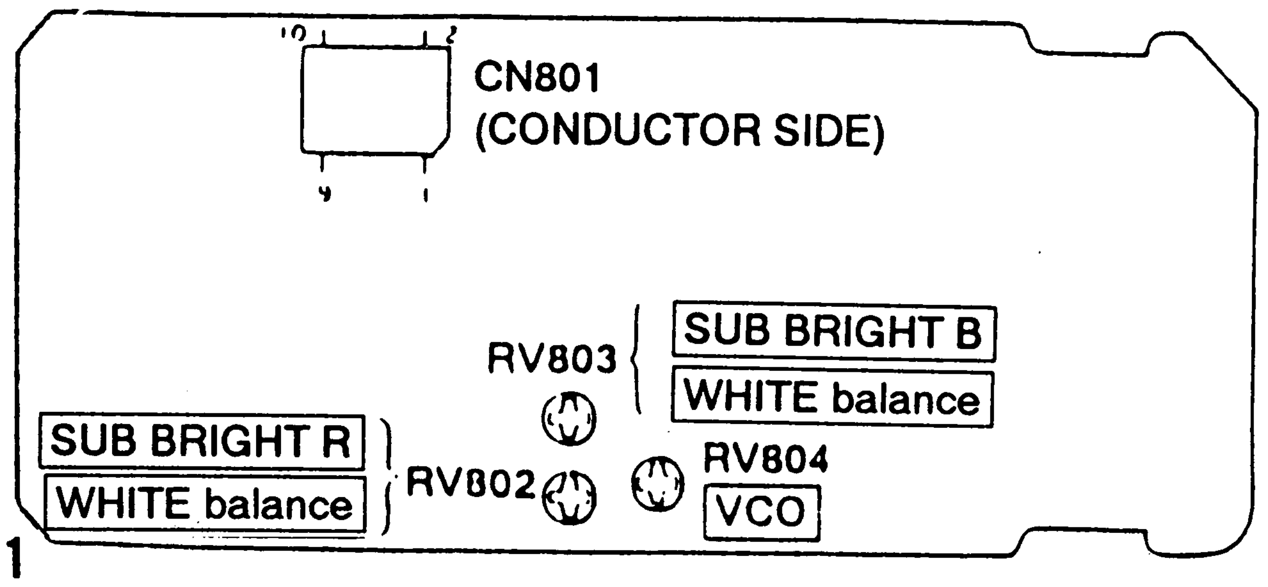


Fig. 7-1-20.

VF-68 BOARD (COMPONENT SIDE)

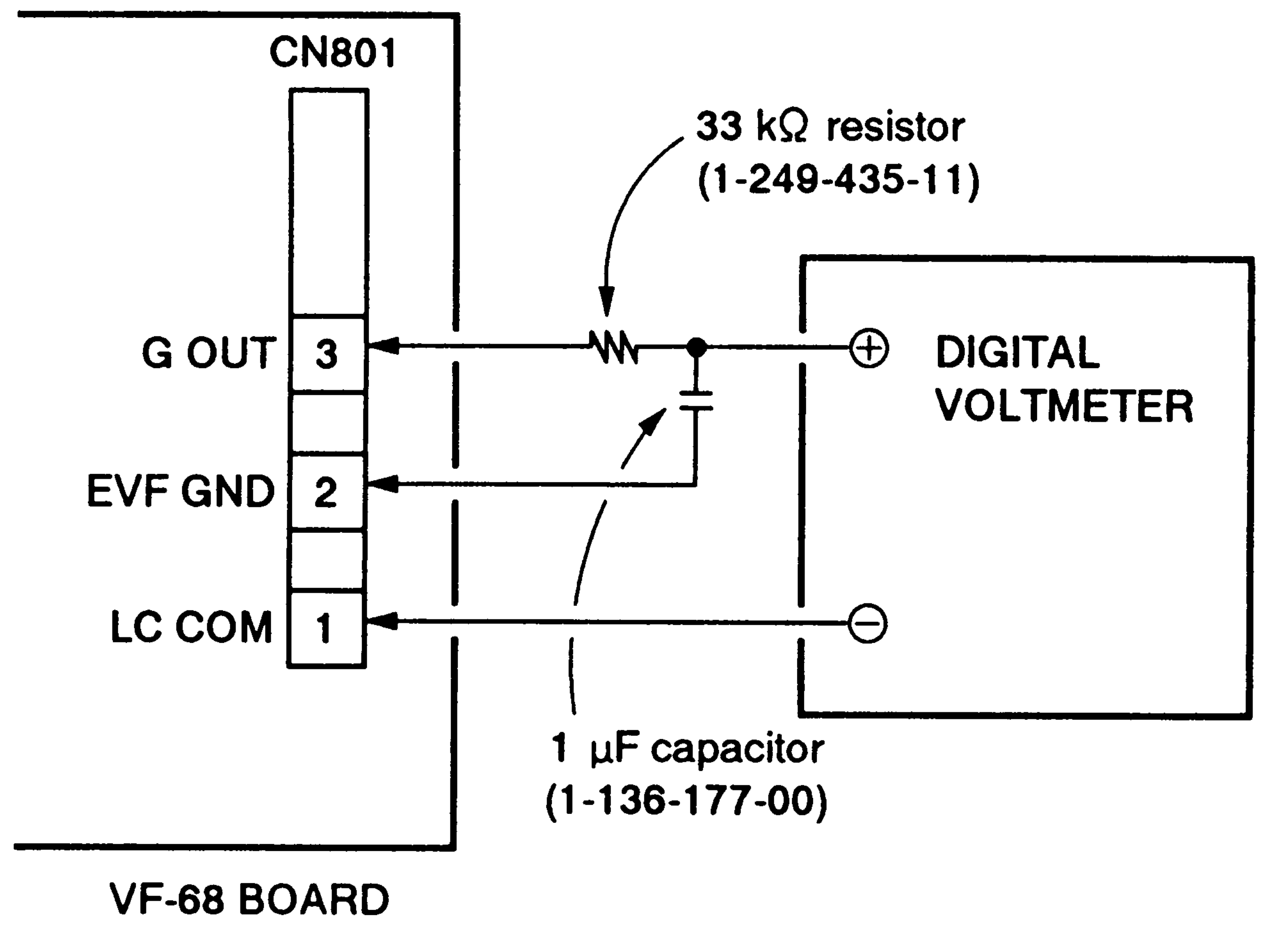


4. LC COM voltage check (VF-68 Board)

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	+: Pin ③ of CN801 (G OUT) –: Pin ① of CN801 (LC COM)
Measuring Instrument	Digital voltmeter
Specified Value	A=+0.35 ± 0.1 Vdc

Connection:

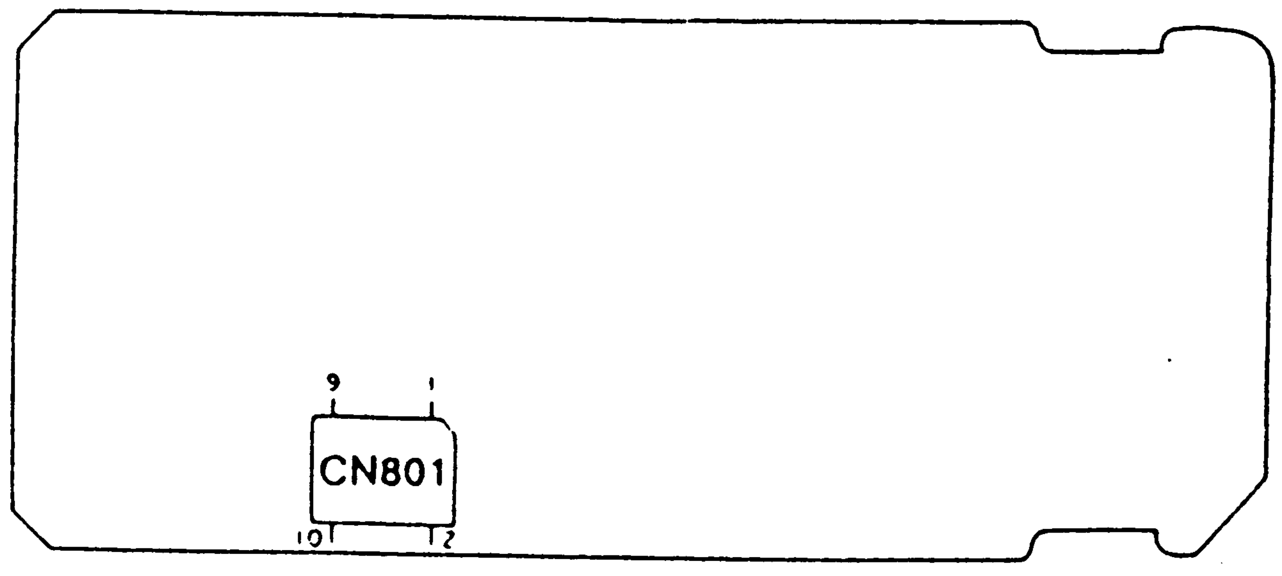
1) Connect the digital voltmeter as shown in the following figure.


CN801
33 kΩ resistor
(1-249-435-11)
G OUT
3
EVF GND
2
LC COM
1
⊕
DIGITAL
VOLTMETER
⊖
1 μF capacitor
(1-136-177-00)
VF-68 BOARD

Checking method:

1. Check that the voltage difference (A) satisfies the specified value.

VF-68 BOARD (CONDUCTOR SIDE)


9
1
CN801
10
2

5. BRIGHT adjustment (VF-69 Board)

Adjust to the proper LCD panel driving video signal level.
If it is not correct, the image will be saturated (whitish) or blackish.

Mode	Record
Signal	No signal
Measurement Point	Pin ③ of CN801 of VF-68 board (G OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV953
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV953.

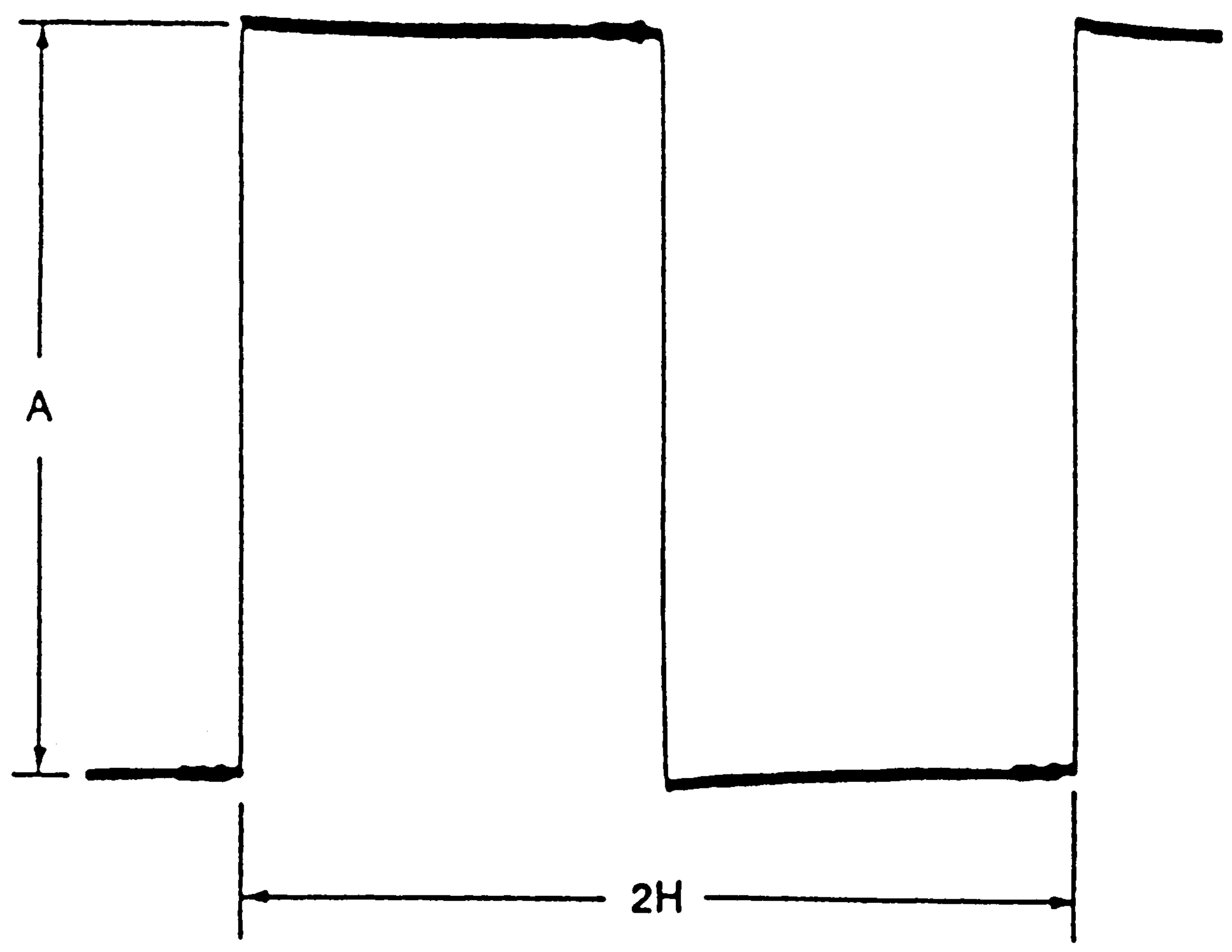
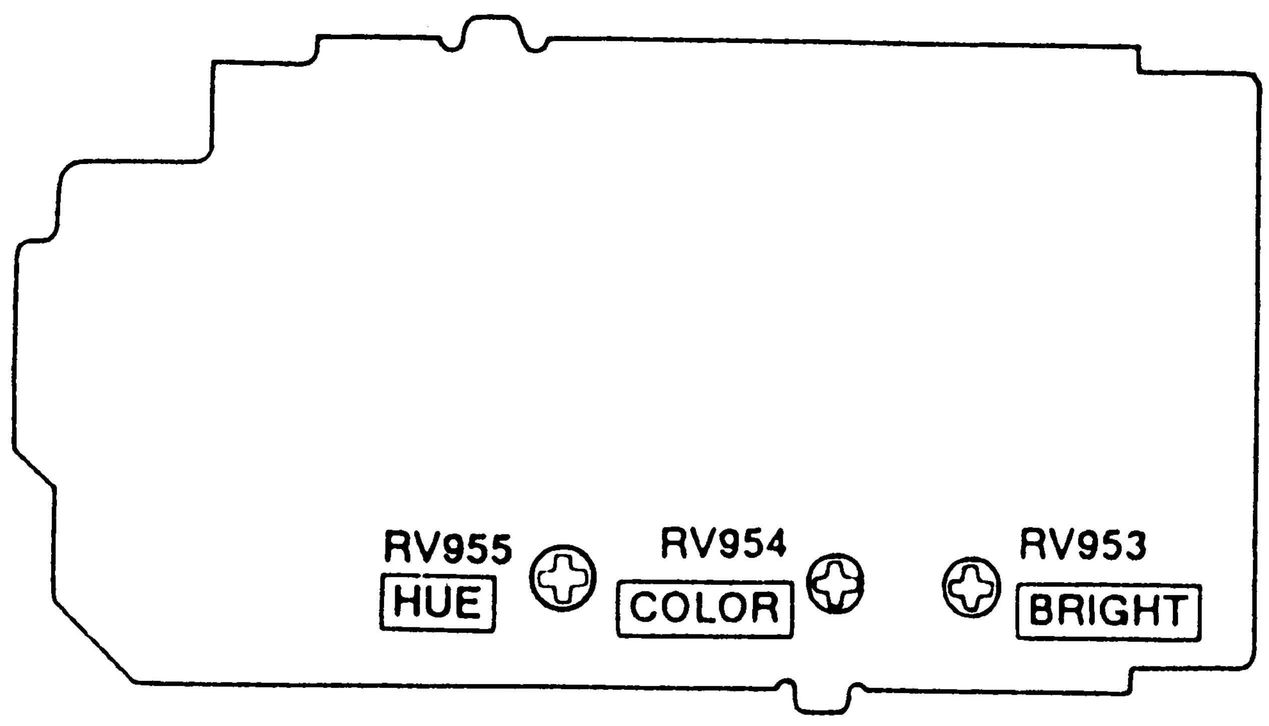


Fig. 7-1-21.

VF-69 BOARD (CONDUCTOR SIDE)


RV955
HUE
RV954
COLOR
RV953
BRIGHT

6. CONTRAST check (VF-68 Board)

Mode	Record
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Pin ③ of CN801 (G OUT)
Measuring Instrument	Oscilloscope
Specified Value	A=2.3 ± 0.15V

Checking method:

1. Check that the white 100% level (A) is the specified value.

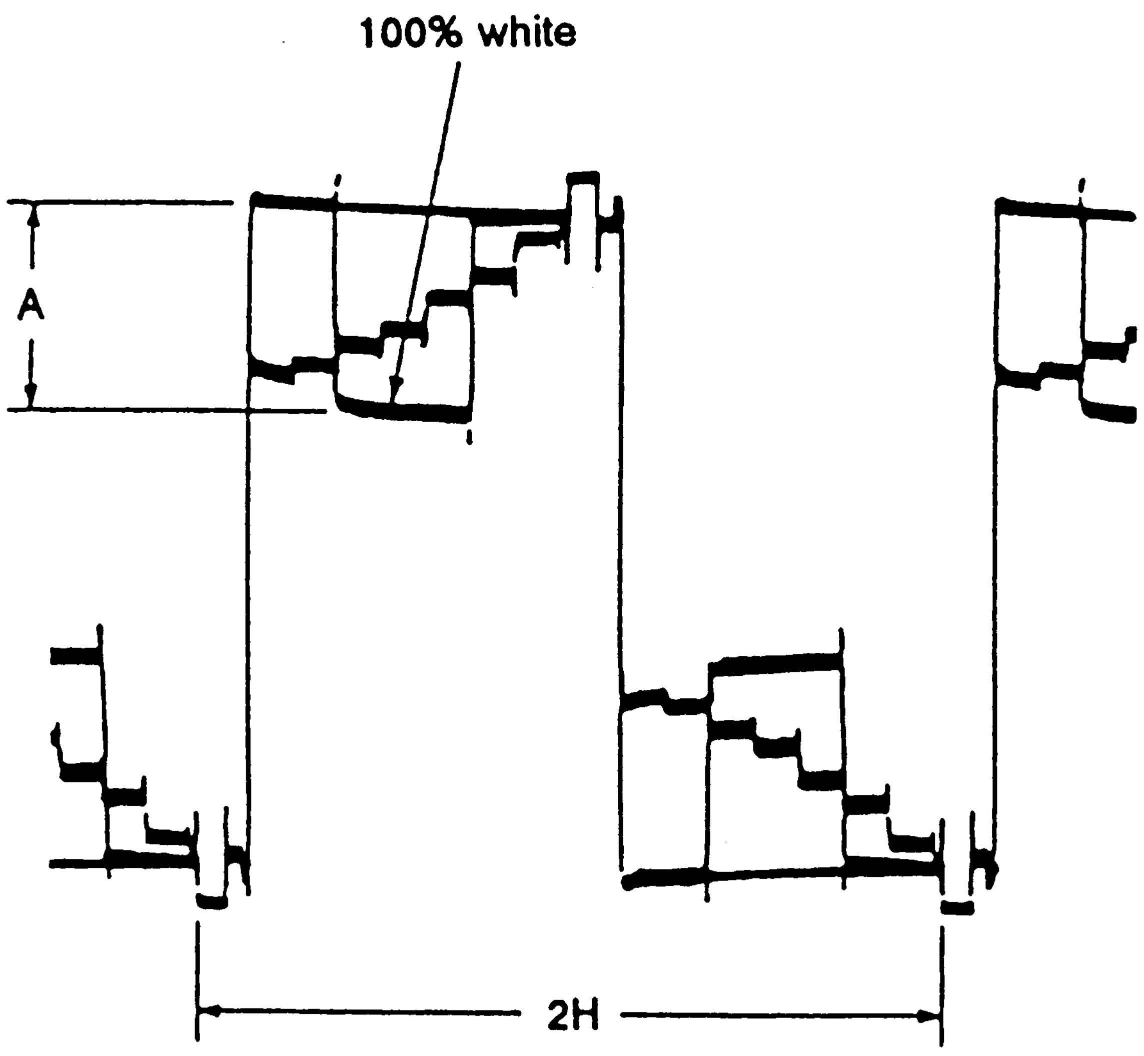
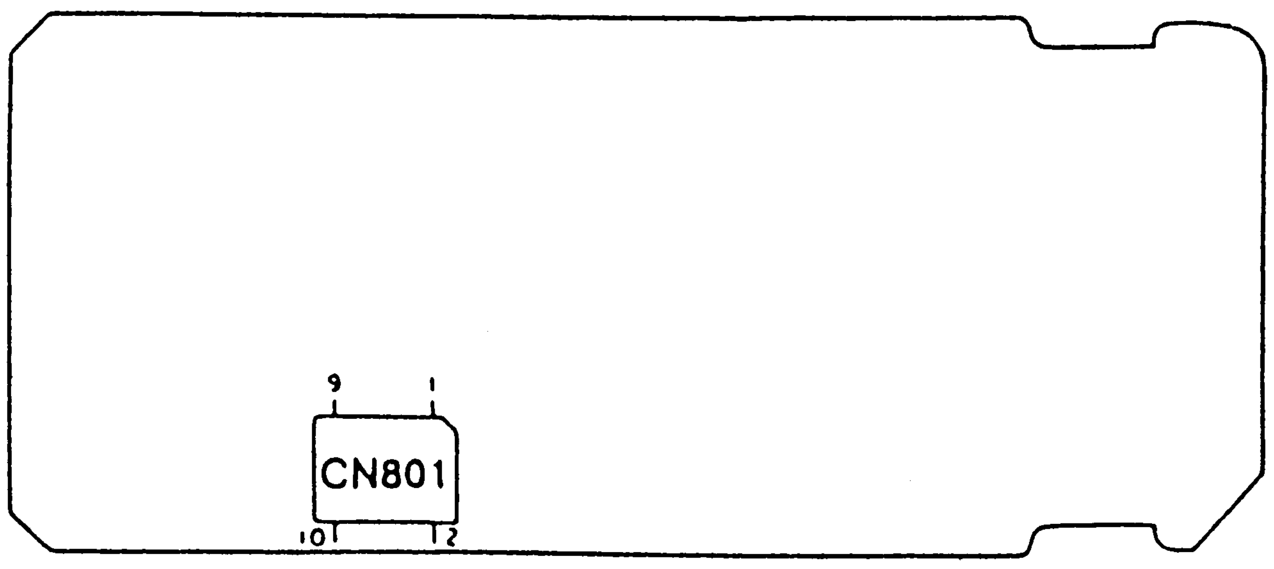


Fig. 7-1-22.

VF-68 BOARD (CONDUCTOR SIDE)


9
1
CN801
10
2

7. SUB BRIGHT R preset adjustment (VF-68 Board)

White balance rough adjustment (1).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑦ of CN801 (R OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV802
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV802.

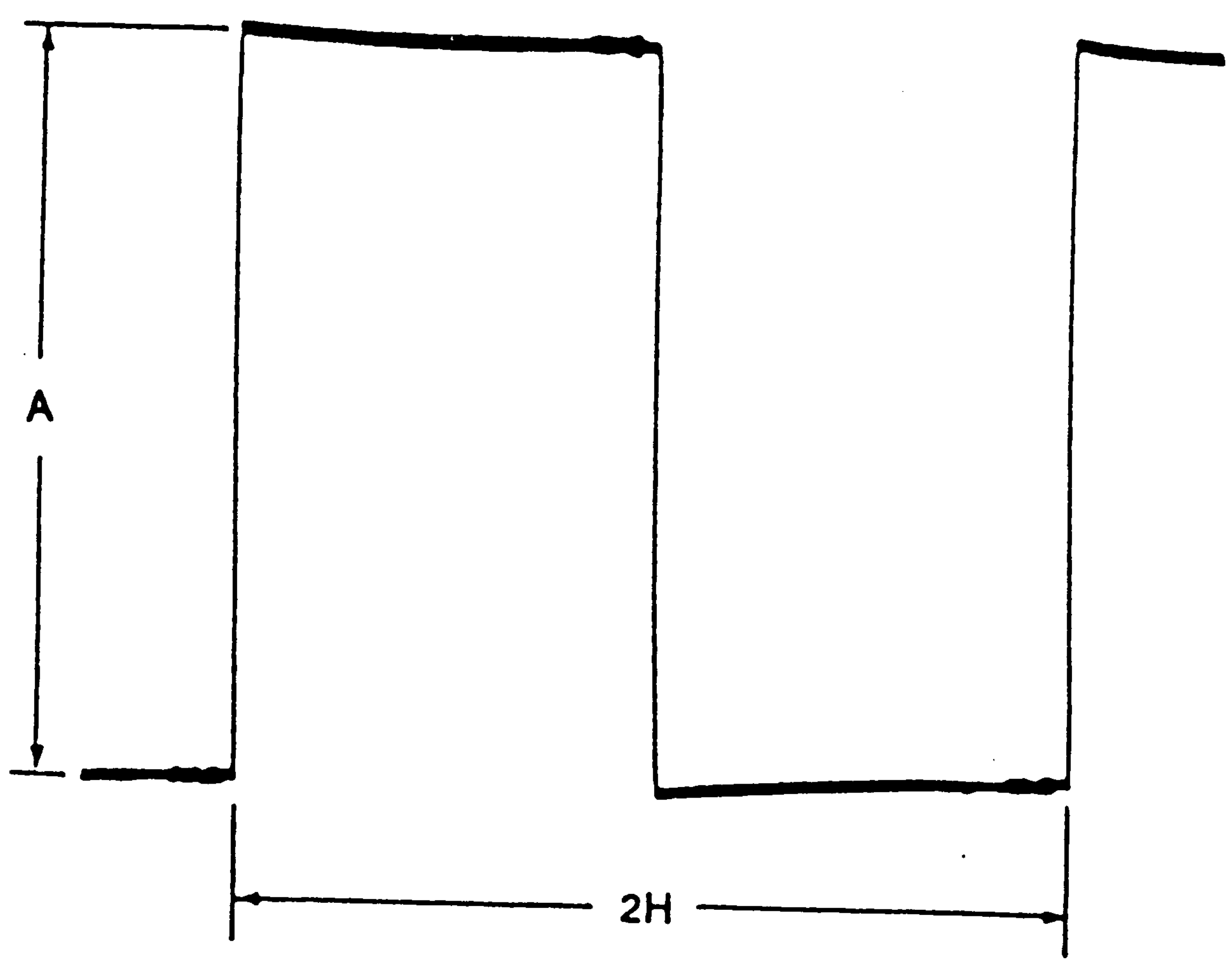
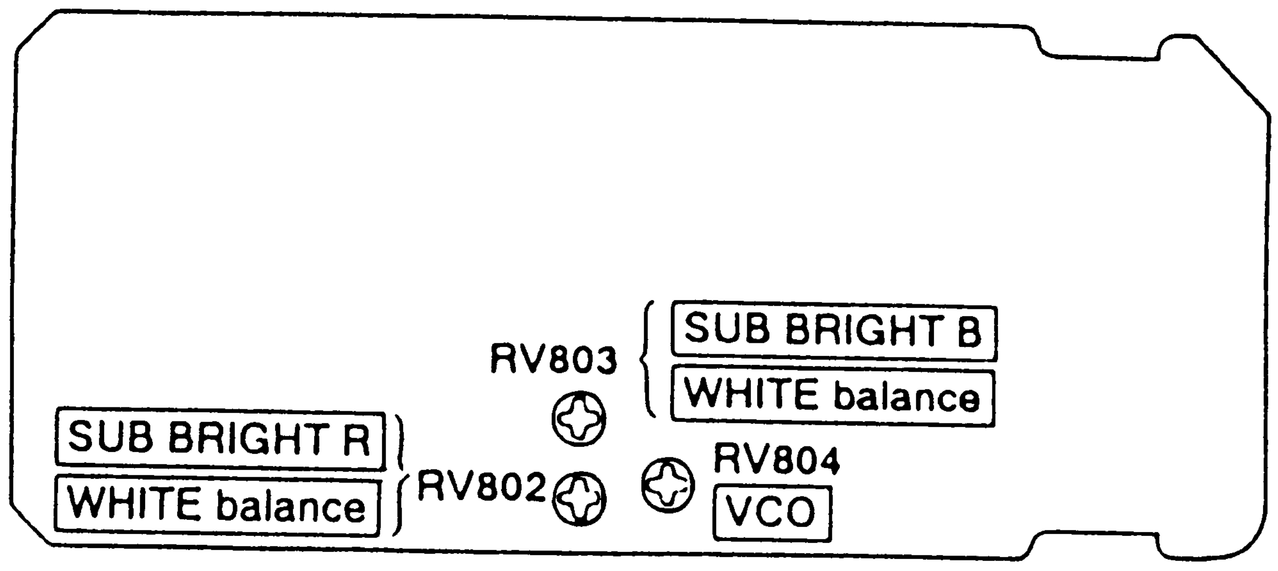


Fig. 7-1-23.

VF-68 BOARD (COMPONENT SIDE)


RV803
SUB BRIGHT B
WHITE balance
SUB BRIGHT R
WHITE balance
RV802
RV804
VCO

8. SUB BRIGHT B preset adjustment (VF-68 Board)

White balance rough adjustment (2).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑧ of CN801 (B OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV803
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV803.

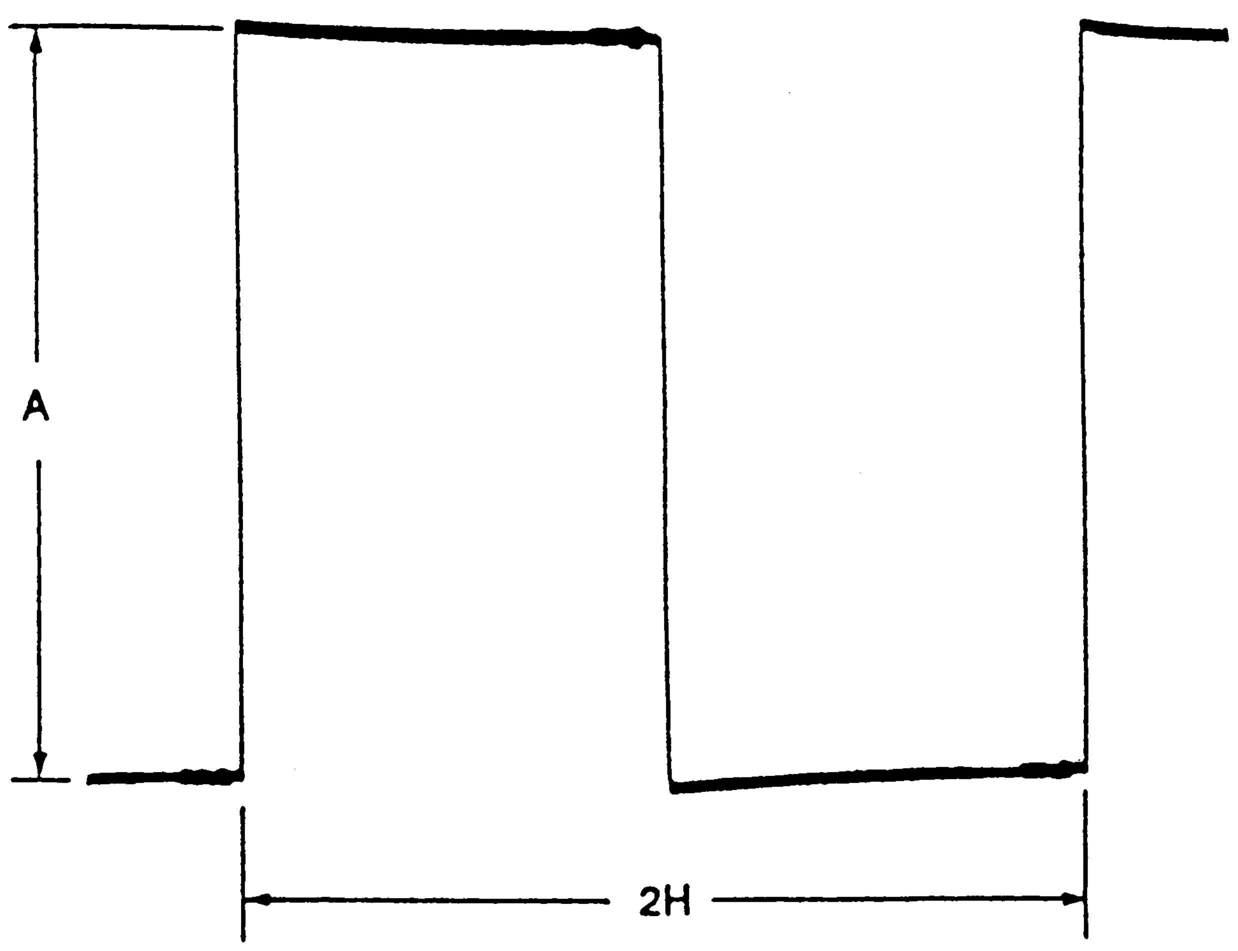


Fig. 7-1-24.

9. White balance adjustment (VF-68 Board)

Adjust to the proper white balance level.

If it is not correct, the color reproducibility of the LCD panel will be poor.

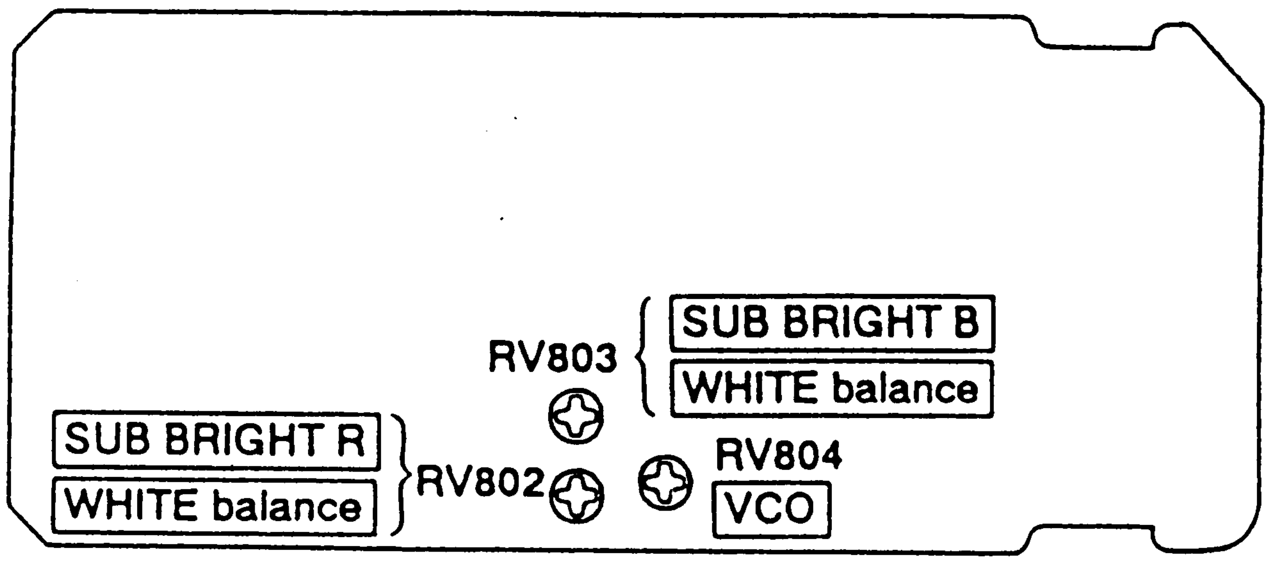
Mode	Record
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Check on LCD display
Measuring Instrument	
Adjustment Element	R: RV802 B: RV803
Specified Value	Picture should not be colored

Note: Turn on the power supply and adjust after more than one minute.

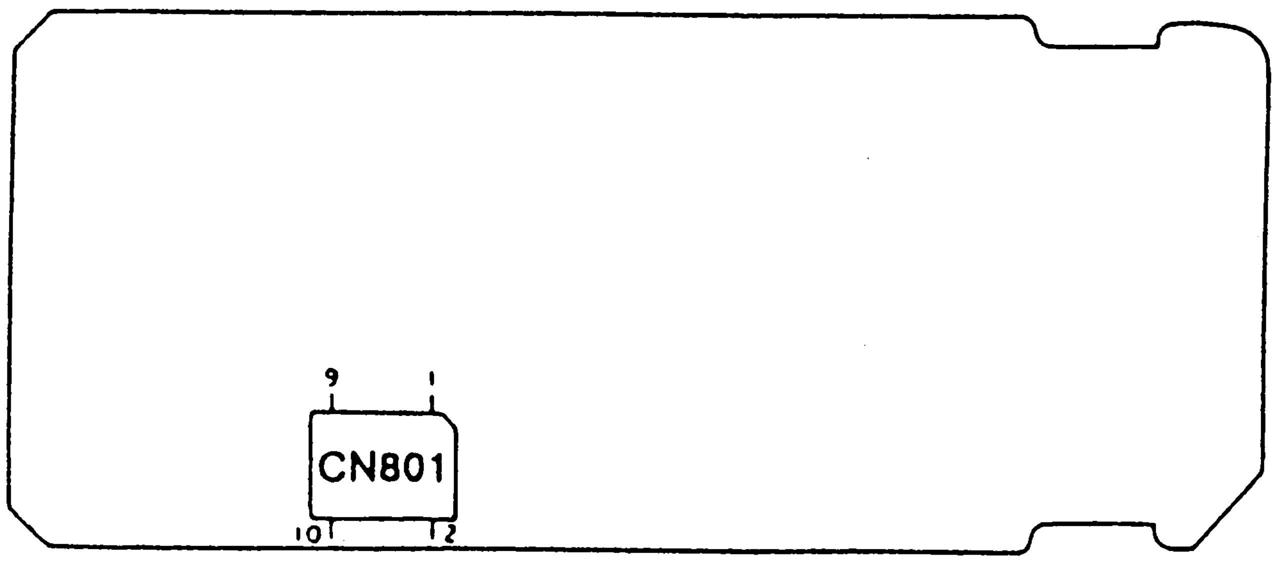
Adjusting method:

1. Check that the LCD display is not colored.
   If it is, adjust RV802 and RV803.

VF-68 BOARD (COMPONENT SIDE)



VF-68 BOARD (CONDUCTOR SIDE)



7-2. MECHANICAL SECTION ADJUSTMENTS

Mechanism Parts Adjustments

For details on the adjustments and checks of mechanical section and replacements of mechanism parts, refer to the separate volume-"8 mm Video Mechanism Adjustment Manual IV A Mechanism".

2-1. OPERATING WITHOUT A CASSETTE

1) Refer to "2. DISASSEMBLY" and supply the power with the cabinet removed. (So that the mechanical deck can be operated.)
2) Connect the adjusting remote commander to the remote terminal.
3) Turn on the HOLD switch of the adjusting remote commander.
4) Close the cassette compartment without loading a cassette and complete loading.
5) Set data: 01 to page: 1, address: 00.
6) Set data: 01 to page: D, address: 02, and press the PAUSE button of the adjusting remote commander.
7) Set data: 04 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.

By carrying out the above procedure, the unit can be operated without loading a cassette.

Be sure to carry out "Processing after Operations" after checking the operations.

Set the data of page: D, address: 03 to the following if the sensor ineffective mode, forced VTR power supply ON mode or forced camera power supply ON mode are to be used together.

Forced VTR power supply ON mode·········06
Forced camera power supply ON mode······05

[Processing after Operations]

1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page D, address: 02, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 00 to page: 1, address: 00.
5) Disconnect the power supply of the unit.

2-2. TAPE PATH ADJUSTMENT

1. Preparations for adjustments

1) Clean the tape path face (tape guide, drum, capstan shaft, pinch roller).
2) Connect the adjusting remote commander to the remote terminal.
3) Turn on the HOLD switch of the adjusting remote commander.
4) Select page: 1, address: 00, and set data: 01.
5) Select page: D, address: 02, and set data: 03.
   (Perform "Processing after operations" after completing adjustments.)
6) Connect the oscilloscope.
   Channel 1-Pin ③ of CN102 of VS-111 board
   External trigger-Pin ④ of CN102 of VS-111 board
   (Connect the oscilloscope via the measuring pin tool for the video section (J-6082-140-A).)
7) Playback the alignment tape (WR5-1NP) for tracking.
8) Check that the RF waveform of the oscilloscope is flat at both the entrance and the exit.
   If not flat, perform necessary adjustment according to the separate 8 mm Video Mechanical Adjustment Manual IV (A Mechanism).
9) Perform "Processing after operations", after completing adjustments.

CN102 of VS-111 board

1	PB ´CH RF
2	PB PCM RF
3	PB RF
4	RF SWP
5	RP GND
6	REC 2

[Processing after operations]

1) Connect the adjusting remote commander, and turn on the HOLD switch.
2) Select page: 1, address: 00, and set data: 01.
3) Select page: D, address: 02, and set data: 00.
4) Press the PAUSE button of the adjusting remote commander.
5) Remove the power supply from the unit.

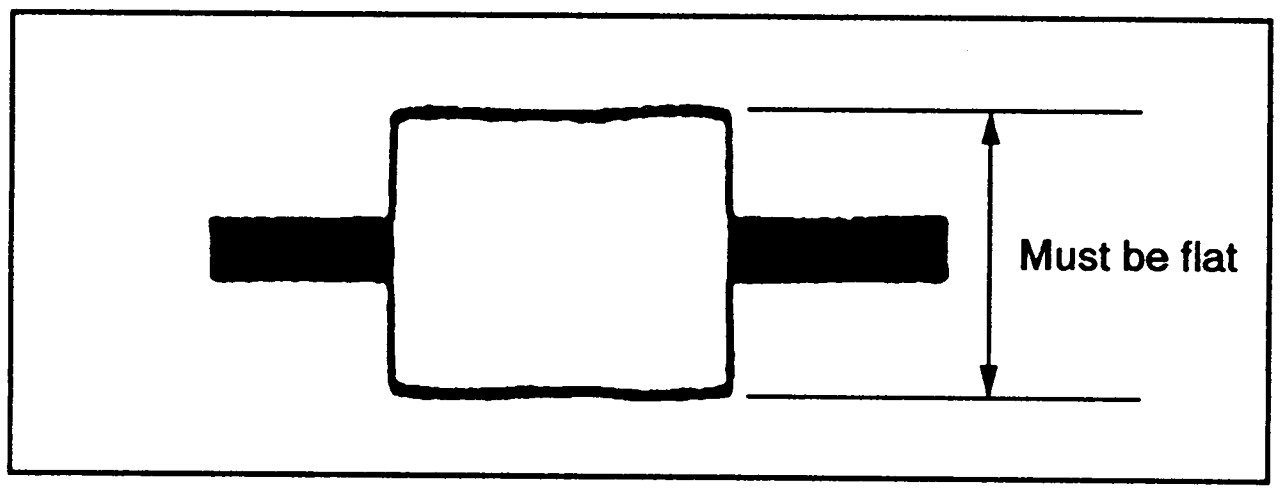


Fig. 7-2-1.

7-3. VIDEO SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7–60.

3-1. PREPARATIONS BEFORE ADJUSTMENT

The following adjusting instruments are used for adjusting the video section.

3-1-1. Equipments to be Used

1) TV monitor
2) Oscilloscope: 2 phenomena, band 30 MHz or wider, with delay mode. (Use a 10:1 probe unless specified otherwise.)
3) Frequency counter
4) Pattern generator with video output terminal
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuater
10) Regulated power supply
11) Alignment tape
    For tracking adjustment (WR5-1NP)
    Part Code: 8-967-995-02
    For video frequency characteristics adjustment (WR5-6N)
    Part Code: 8-967-995-12
    For checking operations
    (WR5-4NL)[Note 1]
    Part Code: 8-967-995-51
    (WR5-5NSP)[Note 2]
    Part Code: 8-967-995-42
    For checking AFM stereo operations (WR5-9NS)
    Part code: 8-967-995-23
    Note: The following alignment tapes can also be used.
    1) WR5-3NL (8-967-995-31)
    2) WR5-4NSP (8-967-995-41)
12) Remote commander for adjustment (J-6082-053-B)
13) VC-142 board extension cord (42P, 0.8 mm)
    Part Code: J-6082-285-A
14) Control switch block (FK board) extension cord (9P, 0.8 mm)
    Part Code: J-6082-288-A
15) Control switch block (CK board) extension cord (18P, 0.8 mm)
    Part Code: J-6082-289-A

3-1-2. Adjusting Precautions

1) The adjustment for this unit is performed using the VIDEO input or the camera input. The camera input can be used for video adjustments only. Use the VIDEO input for the other adjustments.
   When using the VIDEO input, set the power supply switch to "PLAYER" or set the "forcible VTR power supply ON mode" using the adjusting remote commander. (Note 1).
   When using the camera input, set the power supply switch to "CAMERA" or set the "Forcible camera+VTR power supply ON mode" using the adjusting remote commander (Note 2).
   After completing adjustments, be sure to exit the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode" (Note 3).
2) The F panel block (microphones) is not used for video adjustments. Disconnect the following connector in these adjustments.
   1. CN002 of the MA-198 board (2P, 1.5 mm)
   2. CN003 of the MA-198 board (2P, 1.5 mm)
3) MA-198 board is required only for audio adjustments. When not using it, disconnect the following connector.
   1. CN1301 of the AU-168 board (11P, 0.8 mm)
4) The view finder (VF board) is not used for video adjustments. Disconnect the following connector in these adjustments.
   1. CN206 of the VS-111 board (6P, 0.5 mm)
5) The cabinet (R) (CK board: Power supply switch, camera function switch) need not be connected if the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode" is set. In this case, disconnect the following connectors.
   1. CN503 of the VS-111 board (18P, 0.8 mm)
   2. CN101 of the ZB-2 board (4P, 0.8 mm)
   However, as disconnecting these connectors means disconnecting the 3V lithium power supply, data set by the user such as the date, time, and menu will be lost. After completing the adjustments, set these data again, and be sure to exit the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode". (Note 3)
   When connecting the cabinet (R) using the extension cord, use the following type.
   1. J-6080-289-A (18P, 0.8 mm)

6) The lens block and VC-142 board are not used for video adjustments. Disconnect the following connectors in these adjustments.
   1. CN203 of the VS-111 board (42P, 0.8 mm)

   Connect the following when removing the VC-142 board.
   1. Connect Pin ㉒ (REG H) and Pin ⑦ (D3.6V) of CN203 of the VS-111 board with a jumper wire.

   When connecting the VC-142 board using the extension cord, use the following type.
   1. J-6082-285-A (42P, 0.8 mm)
7) The audio board (AU-168 board) is required only for audio adjustments. When not using it, disconnect the following connector.
   1. CN202 of the VS-111 board (34P, 0.8 mm)
8) When opening the VS-111 board, disconnect the following connectors.
   1. CN502 of the VS-111 board (9P, 0.8 mm)

   The VTR function keys will not work. Use the remote commander to perform operations other than EJECT.

   When connecting the FK board and CN502 of VS-111 board using the extension cord, use the following type.
   1. J-6082-288-A (9P, 0.8 mm)

Note 1: Setting the "forcible VTR power supply ON mode (VIDEO input mode)"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 02 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.

By performing the above, the VTR can be operated with the cabinet (R) removed. After completing adjustments, be sure to exit the "forcible power supply ON mode".

Note 2: Setting the "forcible camera+VTR power supply ON mode (camera input mode)"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 03 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.

By performing the above, the VTR can be operated with the cabinet (R) removed. After completing adjustments, be sure to exit the "forcible power supply ON mode".

Note 3: Exiting the "forcible power supply ON mode"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

3-1-3. Connecting the Equipments

Connect the measuring instruments as shown in Fig. 7-3-1. according to the input terminal specifications (VIDEO input or CAMERA input), and perform the adjustments.
The input terminal is specified in the ( ) in the signal column. Either input terminal can be used when there are no specifications.

Note 1: If the VIDEO input is used for the adjustments which specify for the CAMERA input to be used, the product specifications of the unit may not be satisfied in some cases. Be sure to perform according to the specifications.

Note 2: When adjustments are performed with the S video output terminal VTR as the signal source, the efficiencies of the unit may be affected by VTR. It is recommendet that a pattern generator with a Y/C separation output terminal be used as much as possible.

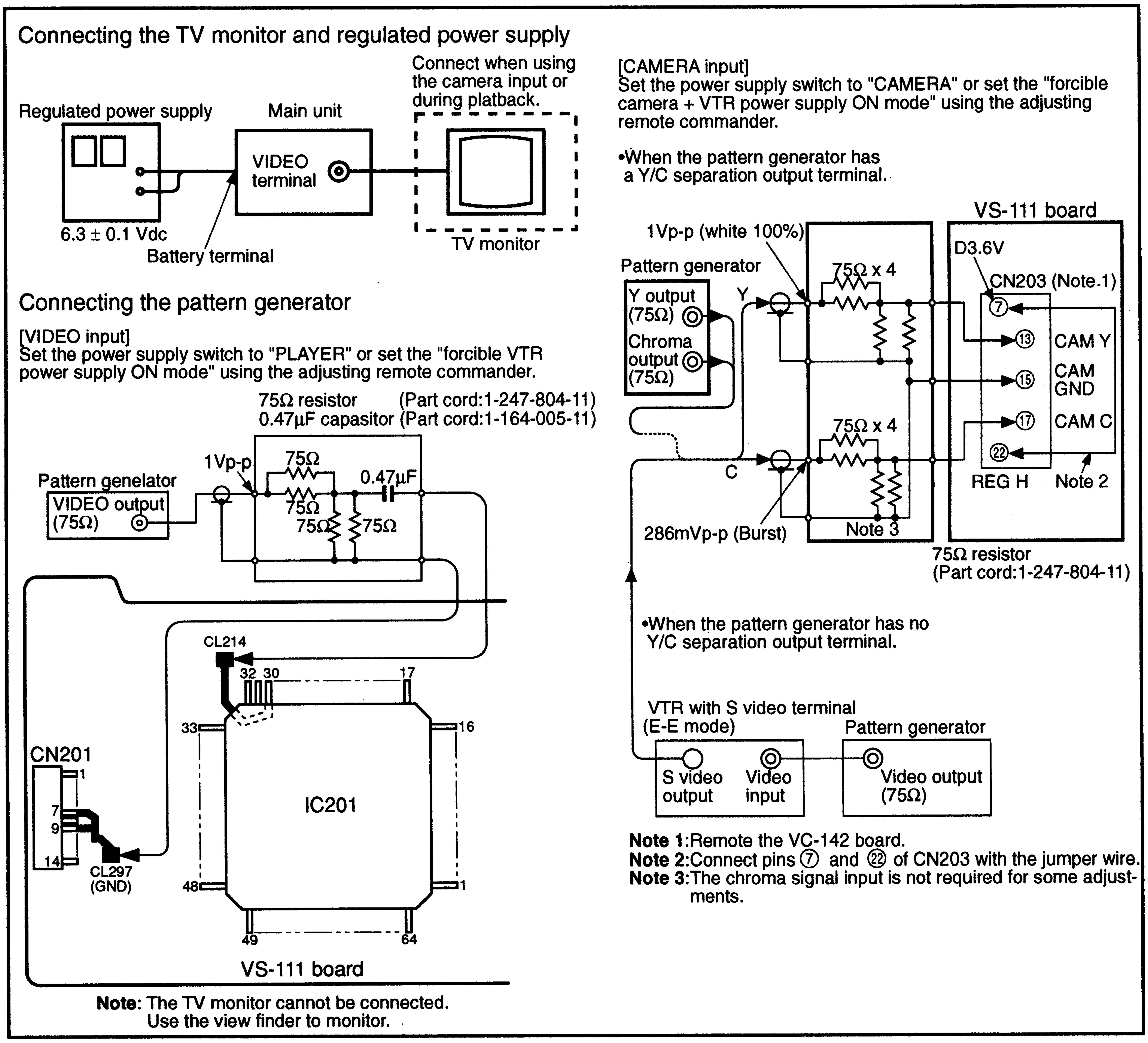
3-1-4. How to Set the REC Mode

1) REC key forbidden accept mode cancel
   1. Connect the adjusting remote commander to the remote terminal.
   2. Turn on the power.
   3. Turn on the HOLD switch of the adjusting remote commander.
   4. Select the page: 1 address: 00, and set the data to 01.
   5. Select the page: D address: 17, and set the data to 12.
   6. Press PAUSE button on the adjusting remote commander.

The REC key is accepted through the above procedure.

2) REC mode setting
   1. Turn off the HOLD switch of the adjusting remote commander.
   2. Press REC buttons of the adjusting remote commander.
   3. Perform "3. Procedure after completed the adjustment", after completing adjustment.

3) Procedure after completed the adjustment
Be sure to return the mode to REC key forbidden accept mode after adjustment.
   1. Connect the adjusting remoter controller.
   2. Turn on the power.
   3. Turn on HOLD switch of the adjusting remote commander.
   4. Select the page: 1 address: 00, and set the data to 01.
   5. Select the page: D address: 17, and set the data to 02.
   6. Press PAUSE button on the adjusting remote commander.
   7. Turn off the power.



Connecting the TV monitor and regulated power supply

Connect when using the camera input or during platback.

Connecting the pattern generator

[VIDEO input]
Set the power supply switch to "PLAYER" or set the "forcible VTR power supply ON mode" using the adjusting remote commander.

75Ω resistor (Part cord:1-247-804-11)
0.47μF capasitor (Part cord:1-164-005-11)

Note: The TV monitor cannot be connected.
Use the view finder to monitor.

[CAMERA input]
Set the power supply switch to "CAMERA" or set the "forcible camera + VTR power supply ON mode" using the adjusting remote commander.

•When the pattern generator has a Y/C separation output terminal.

75Ω resistor
(Part cord:1-247-804-11)

•When the pattern generator has no Y/C separation output terminal.

Note 1: Remote the VC-142 board.
Note 2: Connect pins ⑦ and ㉒ of CN203 with the jumper wire.
Note 3: The chroma signal input is not required for some adjustments.

Regulated power supply
Main unit
VIDEO terminal
6.3 ± 0.1 Vdc
Battery terminal
TV monitor
Pattern genelator
VIDEO output (75Ω)
1Vp-p
75Ω
0.47μF
75Ω
75Ω
75Ω
CL214
32 30
17
33
16
CN201
1
7
9
14
CL297 (GND)
IC201
48
1
49
64
VS-111 board
VS-111 board
1Vp-p (white 100%)
Pattern generator
Y output (75Ω)
Chroma output (75Ω)
Y
C
75Ω x 4
75Ω x 4
D3.6V
CN203 (Note.1)
⑦
⑬
⑮
⑰
㉒
CAM Y
CAM GND
CAM C
REG H
Note 2
286mVp-p (Burst)
Note 3
VTR with S video terminal (E-E mode)
Pattern generator
S video output
Video input
Video output (75Ω)

Fig. 7-3-1.

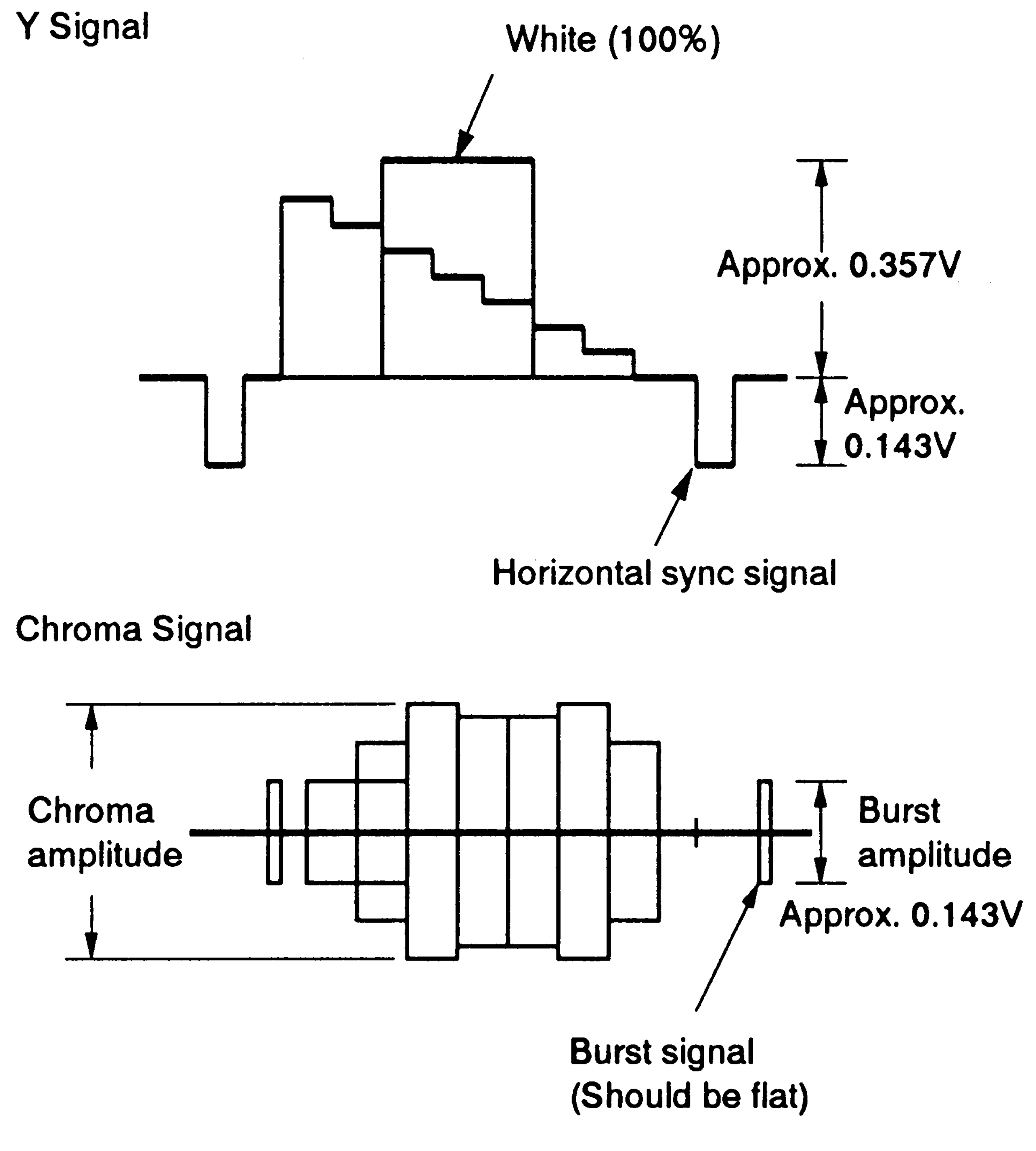
3-1-5. Checking the Input Signals

Because the video signal obtained from the pattern generator is used as the adjustment signal for adjusting the VTR section, the video output signal must satisfy the given specifications.

1. CAMERA Input

Connect the oscilloscope to Pin ⑬ of CN203 on VS-111 board, and check that the sync signal of the Y signal is approximately 0.143 Vp-p and that the amplitude of the video section is approximately 0.357 Vp-p. (When a VTR with the S VIDEO output terminal is used, also check that the chroma signal and burst signal have not remained.) Connect the oscilloscope to Pin ⑰ of CN203 on VS-123 board, and check that the burst signal amplitude of the chroma signal is approximately 0.143 Vp-p and flat, and that the amplitude ratio of the burst signal to the chroma signal is 0.30 : 0.66. The Y and chroma signals used in the adjustment are shown in Fig. 7-3-2.

Note: Be sure to check in the recording mode.


Y Signal
White (100%)
Approx. 0.357V
Approx. 0.143V
Horizontal sync signal
Chroma Signal
Chroma amplitude
Burst amplitude
Approx. 0.143V
Burst signal
(Should be flat)

Burst amplitude: Chroma amplitude=0.30:0.66

Fig. 7-3-2. Color bar signal of pattern generator

2. VIDEO Input

Connect the oscilloscope to Pin ㉚ of IC201 on VS-111 board, and check that the sync signal amplitude of the video signal is approximately 0.143V, the amplitude of the video section is approximately 0.357V, the amplitude of the burst signal is approximately 0.143V and flat, and that the level ratio of the burst signal to the "red" signal is 0.30 : 0.66.

The video signal (color bar) used for adjusting the VTR section is shown in Fig. 7-3-3.

Note: Be sure to check in the record mode.

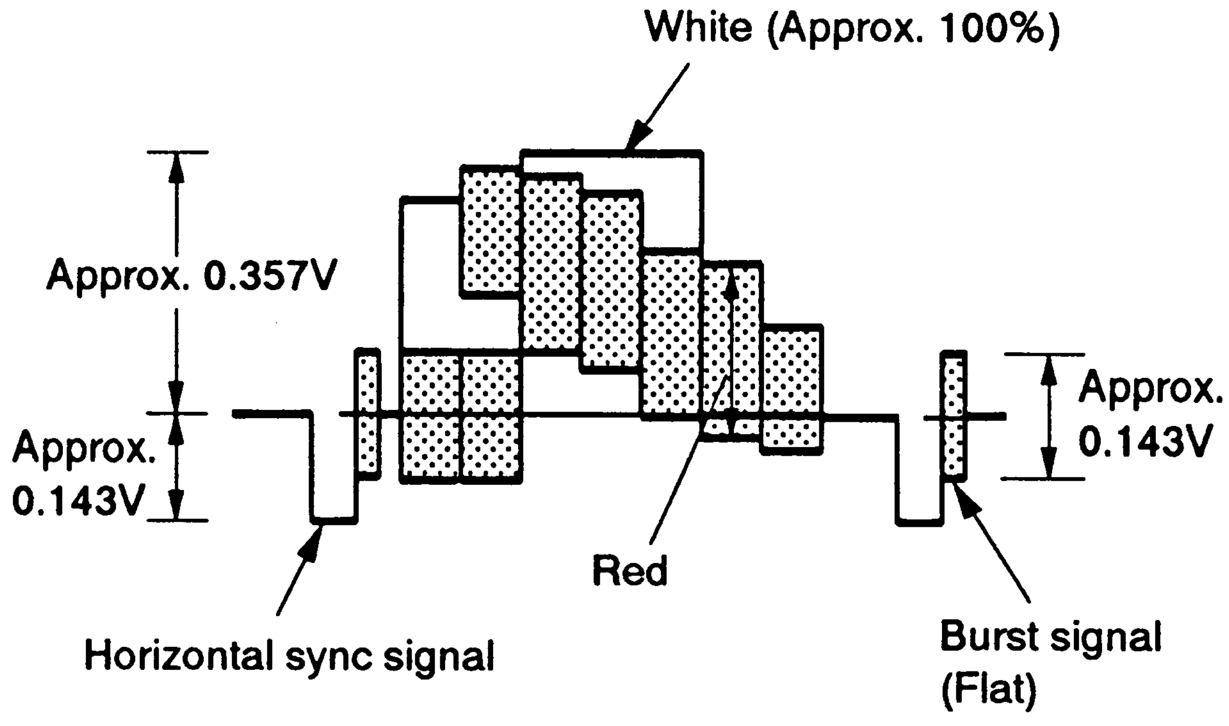

White (Approx. 100%)
Approx. 0.357V
Approx. 0.143V
Approx. 0.143V
Red
Horizontal sync signal
Burst signal
(Flat)

Fig. 7-3-3. Color Bar Signal of Pattern Generator

3-1-6. Alignment Tape

The following table lists alignment tapes which are available. Use the tape specified in the signal column for each adjustment. If the type of tape to be used for checking operations is not specified, use whichever type.

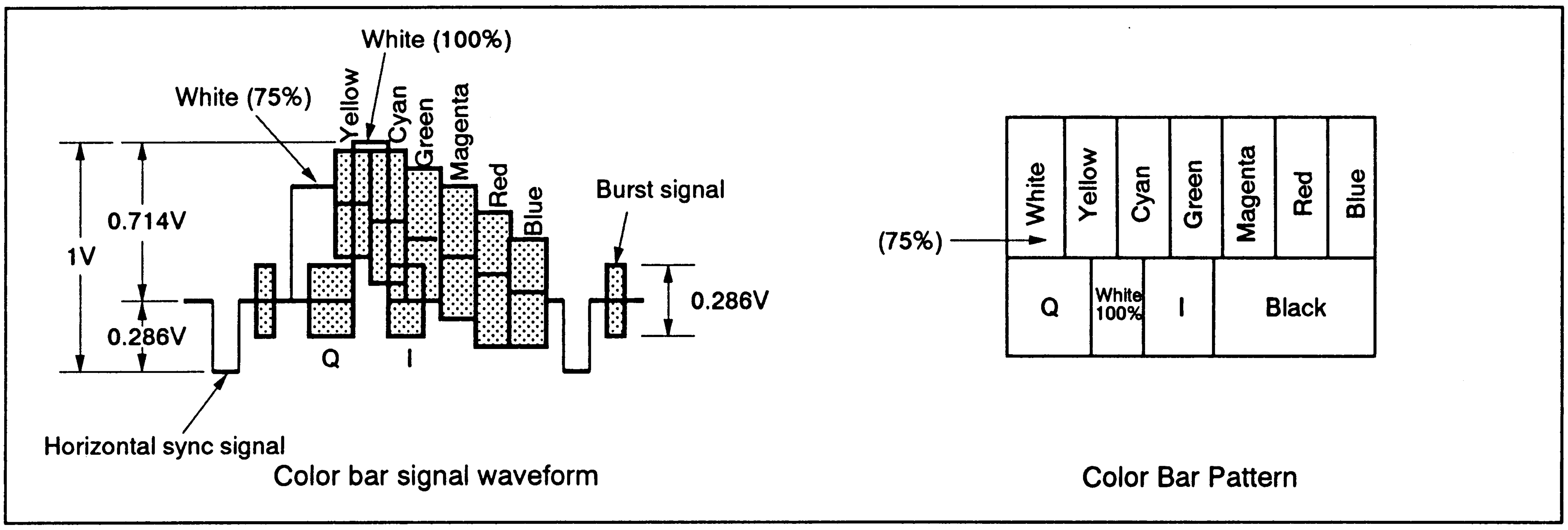
Name	Recording mode	Tape type	Tape speed	Usage
Tracking WR5-1NP	Normal	MP	SP	Tape path adjustment Switching position adjustment
Video frequency characteristics WR5-6N	Normal	MP	SP	Frequency characteristics adjustment
Operation check (SP mode) WR5-5NSP	Normal	MP	SP	Checking operations
Operation check (LP mode) WR5-4NL	Normal	MP	LP	
AFM stereo operation check WR5-9NS	Normal	MP	SP	AFM stereo checking operations

Tape type
MP············· Particle type metal tape
ME············· Evaporated type metal tape

Table 7-3-1.

Fig. 7-3-4. shows the 75% color bar signals recorded on the alignment tape.

Note: Measure using the video output terminal (Terminated at 75 Ω)


White (100%)
White (75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst signal
0.714V
1V
0.286V
0.286V
Q
I
Horizontal sync signal
White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
Q
White 100%
I
Black

Color bar signal waveform

Color Bar Pattern

Fig. 7-3-4. Color Bar Signals of the Alignment Tape

3-1-7. Output Level and Impedance

Video output	Phono-jack, 1 Vp-p, 75Ω , unbalanced, sync negative
Audio output	Phono-jack, –7.5 dBs, (at load impedance 47 kΩ) impedance less than 2.2 kΩ

3-1-8. Service Mode

Note: After the completion of the all adjustments, cancell the service mode by either of the following ways.

1) Unplug the main power supply and remove the lithium battery. (In this case, date and time and menu setting have been set by users are canceled. Perform resetting.)
2) Return data of the address: 00 on page: 1 to 00. And when data on page: 2 is changed, return the data to the original condition.

1. Test mode setting

Set/release each test mode. Set data: 01 to page: 1, address: 00, before setting the data.

Page D	Address 02

Data	Function
00	Normal
01	Test mode 1 Various emergency prohibitions and releases Drum, capstan, loading motor, reel, tape top and end, DEW SP/LP automatic discrimination prohibition, manual switching, 5 minutes pause release prohibition Power off prohibition/release by battery end

Page D	Address 03

Data	Function
00	Normal
01	Camera power ON
02	VTR power ON
03	Camera + VTR power ON

* For page D, the data set will be recorded in the nonvolatile memory by pressing the PAUSE button on the adjusting remote commander. Take note that, in this case, the test mode will not be released even if the main power has been turned off (6.3 Vdc).

* Be sure to return this address data to 00 after completing adjustments/repairs and press the PAUSE button of the adjusting remote commander.

2. Emergency code

Fault (error) symptoms can be checked.

Page D	Address E4

Last emergency code

……Last error code generated (This data will be renewed each time an error occurs.)

Page D	Address E8

2nd emergency code

……2nd error code generated

Page D	Address EC

First emergency code

……First error code generated

* Be sure to rewrite the data of addresses E4, E8 and EC to 00 after repairs/adjustments.

* When rewriting the data, be sure to press the PAUSE button of the remote commander after setting the data.

Code	Error Condition
00	No error
01	Loading motor error
02	Reel error during unloading
03	Reel errors at other times
04	Capstan error
05	FG error during drum start up
06	PG error during drum start up
07	FG error during normal drum conditions
08	PG error during normal drum conditions
09	Phase error during normal drum conditions

3. Emergency mode

The operation mode can be checked during faults.

Page D	Address E5

Last emergency mode
……The operation mode when the last error is generated
(This data will be renewed each time an error occurs.)

Page D	Address E9

2nd emergency mode
……The operation mode when the 2nd error is generated

Page D	Address ED

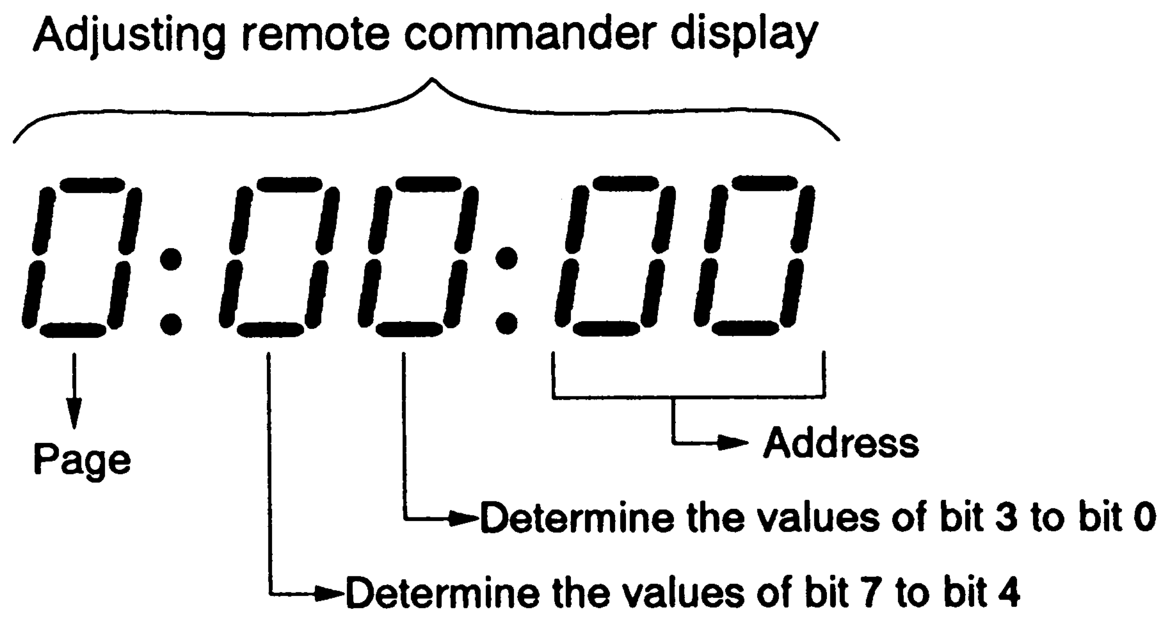
First emergency mode
……The operation mode when the first error is generated

- * Be sure to rewrite the data of addresses E5, E9 and ED to 00 after repairs/adjustments.
- * When rewriting the data, be sure to press the PAUSE button of the adjusting remote commander after setting the data.

Code	Error Conditions
00	BEFOR INITIALIZE
01	EJECTED
02	NORMAL STOP
03	FF
04	NORMAL REC
06	NORMAL PB
07	PB PAUSE
12	LOADING
14	REC PAUSE
26	X1
27	1/5 SLOW
31	UNLOADING
46	CUE
56	REVIEW
62	STOP TAPE END
66	X2
67	FRAME
72	STOP TAPE TOP
83	REWIND
85	REC REVIEW (+)
95	REC REVIEW (–)
97	–PB PAUSE
A2	EMERGENCY LOADING
A5	EDIT SEARCH (+)
B1	EMERGENCY UNLOADING
B2	STOP EMERGENCY 1
B5	EDIT SEARCH (–)
C2	STOP EMERGENCY 2
E2	STOP NO CASSETTE
F5	EDIT PAUSE

4. Bit value discrimination

Bit values must be discriminated using the display data of the adjusting remote commander for the following items. Use the table below to discriminate if the bit value is "1" or "0".


Adjusting remote commander display
0:00:00
Page
Address
Determine the values of bit 3 to bit 0
Determine the values of bit 7 to bit 4

	Remote controller display	Bit value			
		bit 3 or bit 7	bit 2 or bit 6	bit 1 or bit 5	bit 0 or bit 4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ→	8	1	0	0	0
	9	1	0	0	1
	A(A)	1	0	1	0
	B(b)	1	0	1	1
	C(c)	1	1	0	0
	D(d)	1	1	0	1
Ⓑ→	E(E)	1	1	1	0
	F(F)	1	1	1	1

(Example) If the remote commander display data is "8E", bit values from bit7 to bit4 can be discriminated from column Ⓐ, and those from bit3 to bit0 from column Ⓑ.

5. Battery voltage check

Page 2	Address 49

Display Data	Battery Voltage
F0	Approx. 10.6 Vdc
E0	Approx. 9.9 Vdc
D0	Approx. 9.2 Vdc
C0	Approx. 8.5 Vdc
B0	Approx. 7.8 Vdc
A0	Approx. 7.1 Vdc
90	Approx. 6.4 Vdc
80	Approx. 5.7 Vdc
70	Approx. 5.0 Vdc

Using method:

Order	Page	Address	Data	Procedure
1	2	00	01	Preparation
2	2	49		The battery voltage can be discriminated by the display data.

* Voltage measurement accuracy is approx. ± 10%.

6. Mechanism controller input/output check

Page 2	Address 83

Bit	IN/OUT Signal	Condition
0		
1	E/L DET	"1"=Hi8, "0"=Normal
2	SP/LP DET	"1"=SP, "0"=LP
3	CLOG DET	"1"=Clog detected, "0"=Others
4	REC PROOF	"1"=Recording prohibited, "0"=Recording possible
5	TAPE PREEND	"1"=Tape preend, "0"=Others
6	DEW DET	"0"=Condensation occured, "1"=Others
7	CASSETTE IN	"0"=No cassette

Using method:

Order	Page	Address	Data	Procedure
1	2	00	00	Preparation
2	2	83		The condition of each input signal can be discriminated by differentiating the bit value of the display data.

Page 2	Address 84

Bit	IN/OUT Signal	Condition
0	VA PB MODE	"1"=PB, "0"=REC
1	RP PB MODE	"1"=PB, "0"=REC
2	JOG	"1"=Variable speed playback, "0"=Others
3	ME/MP SW	"1"=ME tape, "0"=Other tape
4	Hi8 MP SW	"1"=Hi8 MP tape, "0"=Other tape
5	SERVO OPERATION	"1"=SP mode, "0"=LP mode
6	VIDEO MUTE	"1"=Mute, "0"=Video output
7	AUDIO MUTE	"1"=Mute, "0"=Audio output

Using method:

Order	Page	Address	Data	Procedure
1	2	00	00	Preparation
2	2	84		The condition of each signal can be discriminated by differentiating the bit value of the display data.

7. Mode switch and CC DOWN switch check

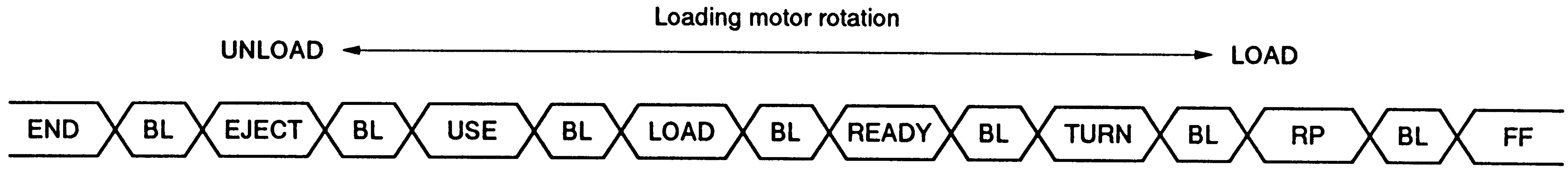
The mode switch position (mechanical section condition) can be checked.

Page 3	Address E9

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
MSW 2	MSW 1	MSW 0	CC DOWN				

				DATA	POSITION	FUNCTION
0	0	0	0/1	E*/F*	BL	Interval of each position
0	1	1	1	7*	END	FULL END processing (T side lock removal)
0	0	1	1	3*	EJECT	Cassette compartment ejection
1	0	1	1	B*	USE	EJECTED (Unskate end)
0	0	1	0	2*	LOAD	LOADING (Skate in)
1	0	0	0	8*	READY	NORMAL STOP position
1	1	0	0	C*	TURN	OFF of pinch roller only with STOP↔FF/REW (oscillating position)
0	1	0	0	4*	RP	PB, REC, RVS, REV, CUE
0	0	0	0	0*	FF	FF/REW

*: Don't care


Loading motor rotation
UNLOAD
LOAD
END
BL
EJECT
BL
USE
BL
LOAD
BL
READY
BL
TURN
BL
RP
BL
FF

Using method:

Order	Page	Address	Data	Procedure
1	3	00	00	Preparation
2	3	E9		The mode switch position and CC DOWN switch condition can be discriminated by the display data.

8. Tape top/end sensor check

Page 3	Address 0A

Display Data	Tape Top/End Sensor Condition
00	Tape present (Middle of tape)
01	Tape end
10	Tape top
11	No tape

Tape end sensor condition
Tape top sensor condition

"0"=Non active (Not receiving light)
"1"=Active (Receiving light)

Using method:

Order	Page	Address	Data	Procedure
1	3	00	02	Preparation
2	3	0E	10	Preparation
3	3	0A		The condition of the tape top/end sensor can be discriminated by the display data.

9. Page D address list

Note 1: The adjustment data initial value is the data input before performing video section adjustments (Page D) if the Page D data has been erased due to some reason.

Note 2: The data written in the adjustment data memo column are fixed.
After adjusting, check that these data have not been rewritten by mistake.

Note 3: In some case, data have been input to the page D address 91 to D3 and F0 to FF. This has no relation to the adjustment.

Address	Adjustment data	
	Initial value	Memo column
00		
01		
02	00	00
03	00	00
04	80	
05	0B	
06	66	
07	7F	
08	84	
09	8A	
0A	8E	
0B	00	00
0C		
0D		
0E		
0F		
10	00	00
11	00	00
12	00	00
13	00	00
14	95	95
15	77	77
16	01	01
17	02	02
18	65	65
19	40	40
1A	DC	DC
1B	60	60
1C	00	00
1D	00	00
1E		
1F		

Table 7-3-2. (1)

Address	Adjustment data	
	Initial value	Memo column
20		
21		
22		
23	00	00
24	00	00
25	00	00
26	14	14
27	14	14
28	64	64
29	64	64
2A	6E	6E
2B	6E	6E
2C	64	64
2D	64	64
2E	6E	6E
2F	6E	6E
30	DC	DC
31	DC	DC
32	DC	
33	DC	
34	DC	DC
35	DC	DC
36	DC	
37	DC	
38	E4	
39	EB	
3A	E4	
3B	EB	
3C		
3D		
3E		
3F		
40		
41		
42	A9	
43	A9	
44		
45		
46	A9	
47	A9	
48		
49		

Table 7-3-2. (2)

Address	Adjustment data	
	Initial value	Memo column
4A		
4B		
4C		
4D		
4E		
4F		
50	A2	A2
51	A1	A1
52		
53		
54	00	00
55	00	00
56	90	90
57	00	00
58	00	00
59	75	75
5A	E6	E6
5B	E6	E6
5C	E6	E6
5D	E6	E6
5E	E6	
5F	E2	E2
60	E2	E2
61	E2	E2
62	E2	E2
63	E2	
64		
65		
66		
67		
68		
69	E6	E6
6A	E6	E6
6B	E6	E6
6C	E6	E6
6D	E6	E6
6E		
6F		
70	A4	
71	95	
72	B0	B0
73	B0	B0

Table 7-3-2. (3)

Address	Adjustment data	
	Initial value	Memo column
74		
75	BB	
76		
77	97	
78	00	00
79	00	00
7A	86	86
7B	86	86
7C	00	00
7D	00	00
7E	00	00
7F	00	00
80	99	
81	99	
82	A5	
83	A9	
84		
85	69	69
86	00	00
87	69	
88	B5	B5
89	B5	B5
8A	00	00
8B	48	48
8C	AF	
8D	AF	
8E	AF	
8F	AF	
90	60	60
91 to E3		
E4	00	
E5	00	
E6	00	
E7	00	
E8	00	
E9	00	
EA	00	
EB	00	
EC	00	
ED	00	
EE	00	
EF	00	

Table 7-3-2. (4)

3-2. POWER SYSTEM ADJUSTMENTS

1. Oscillator Frequency Check (DD-65 board)

Mode	Camera record
Subject	Arbitrary
Measurement Point	Q905 collector
Measurement Instrument	Freqnency counter
Specified Value	500 ± 50kHz

Adjusting method:

1) Check that the oscillator frequency satisfies the specified value.

2. Power Voltage Check (DD-65 board)

Mode	Camera record
Subject	Arbitrary
Measuring Instrument	Digital voltmeter
D5V check	
Measurement Point	Pin ㉙ of CN901
Specified Value	4.9 ± 0.1 Vdc
EVF5V check	
Measurement Point	Pin ㊴ of CN901
Specified Value	4.9 ± 0.1 Vdc
VID 5V check	
Measurement Point	Pins ㉓ and ㉔ of CN901
Specified Value	4.9 ± 0.1 Vdc
AU 5V check	
Measurement Point	Pin ㉟ of CN901
Specified Value	4.9 ± 0.1 Vdc
RP 5V check	
Measurement Point	Pin ⑳ of CN901
Specified Value	4.9 ± 0.1 Vdc
CAM5V check	
Measurement Point	Pins ㉕ and ㉖ of CN901
Specified Value	4.85 ± 0.1 Vdc
SS 3.6V check	
Measurement Point	Pin ㉝ of CN901
Specified Value	3.6 ± 0.1 Vdc
D3.6V check	
Measurement Point	Pins ㉑ and ㉒ of CN901
Specified Value	3.6 ± 0.1 Vdc
CAM 15V check	
Measurement Point	Pin ㉗ of CN901
Specified Value	15 ± 0.3 Vdc
CAM –8.5V check	
Measurement Point	Pin ㉛ of CN901
Specified Value	$-8.5^{+0.25}_{-0.4}$ Vdc
MT 5V check	
Measurement Point	Pins ⑨, ⑱ and ⑲ of CN901
Specified Value	5.0 ± 0.1 Vdc

3-3. SYSTEM CONTROL SYSTEM ADJUSTMENTS

1. Page D Initial Value Input

If the page D data has been erased due to some cause, input the page D initial value before performing adjustments. For details on the initial value, refer to "Page D address list" in "3-1-8. Service Mode".

Mode	E-E
Signal	Arbitrary
Adjustment Page	D
Adjustment Address	00 to 90

Input method:

1) Set data: 01 to page: 1, address: 00.
2) Select page D, and input the initial value to each address. (After setting the data (initial value), be sure to press the PAUSE button of the adjusting remote commander before changing the address.)

2. Battery End Adjustment

Set the battery end voltage.
If the voltage is incorrect, the life of the battery will shorten.
The image at the battery end will also be rough.

Mode	Camera record
Signal	Arbitrary
Measurement Point	LCD display of the adjusting remote control unit
Measuring Instrument	
Adjustment Page	D
Specified Value	06, 07, 08, 09, 0A

Connection:

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-5.

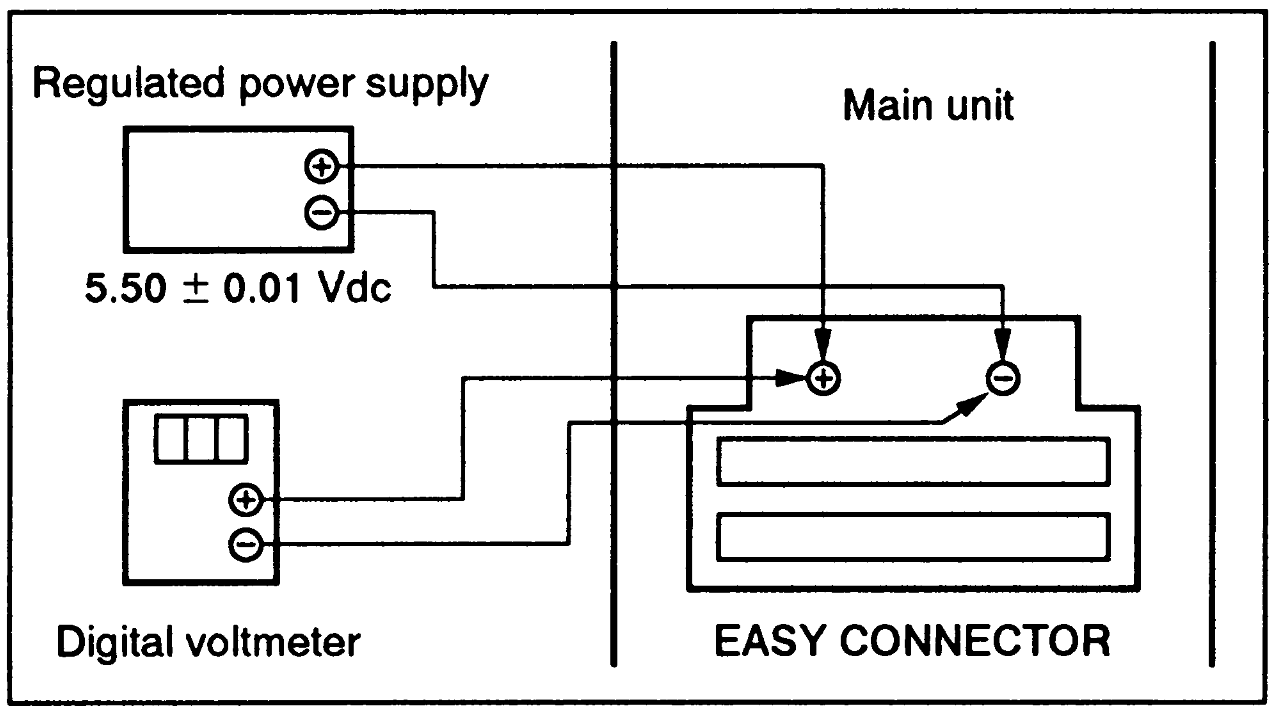


Fig. 7-3-5.

Adjusting method:

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display is 6.3 ± 0.1 Vdc.
2) Set data: 01 to page: 1, address: 00.
3) Decrease the output voltage of the regulated power supply so that the digital voltmeter display is 5.50 ± 0.01 Vdc.
4) Set data: 01 to page: 2, address: 00.
5) Select page: 2, address: 49, read the adjusting remote commander display data, and this data named D6.
6) Set data D6 to page: D, address: 06, and press the PAUSE button of the adjusting remote commander.
7) Convert D6 to decimal notation, and obtain D6′. (Refer to Table 7-1-3. "Hexadecimal notation–decimal notation conversion table")
8) Calculate D7′, D8′, D9′ and DA′ using following equations (decimal notation calculation).
   D7′=D6′+3
   D8′=D6′+8
   D9′=D6′+14
   DA′=D6′+18
9) Convert D7′, D8′, D9′ and DA′ to hexadecimal notation, and obtain D7, D8, D9 and DA.
10) Set data: D7′ to page: D, address: 07, and press the PAUSE button of the adjusting remote commander.
11) Set data: D8′ to page: D, address: 08, and press the PAUSE button.
12) Set data: D9′ to page: D, address: 09, and press the PAUSE button.
13) Set data: DA to page: D, address: 0A, and press the PAUSE button.
14) Perform "Battery Down Check".

3. Battery Down Check

Mode	Camera record
Subject	Arbitrary

Connection

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-5.

Checking method:

Remove the adjusting remote commander, and perform the following check. If the check is not satisfied, perform from the beginning again.

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display becomes 6.3 ± 0.1 Vdc.
2) Set to the camera recording mode.
3) Check that the 🔋 mark on the EVF (viewfinder) display is not lighted up. (TALLY lamp lights up).
4) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.54 ± 0.01 Vdc.
5) Check that the 🔋 mark on the EVF display and the TALLY lamp blinks every second.
6) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.42 ± 0.01 Vdc.
7) Check that the 🔋 mark on the EVF display and the TALLY lamp are blinking faster.

3-4. SERVO SYSTEM ADJUSTMENTS

1. Switching Position Adjustment (VS-111 board)

If deviated in this case causes switching noise or jitter on the played back screen.

Mode	Playback
Signal	Alignment tape: For tracking adjustment (WR5-1NP)
Measurement Point	CH1: Pin ④ of CN102 (RF SWP) CH2: Pin ③ of CN102 (PB RF)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	04, 05
Specified Value	t1=0 ± 10 μsec

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Set data: 0B to page: D, address: 05.
3) Change the data of page: D, address: 05 and minimize "t1". (Coarse adjustment)
4) Change the data of page: D, address: 04, and adjust so that the switching position (t1) becomes the specified value. (Fine adjustment)
5) Press the PAUSE button of the adjusting remote commander.

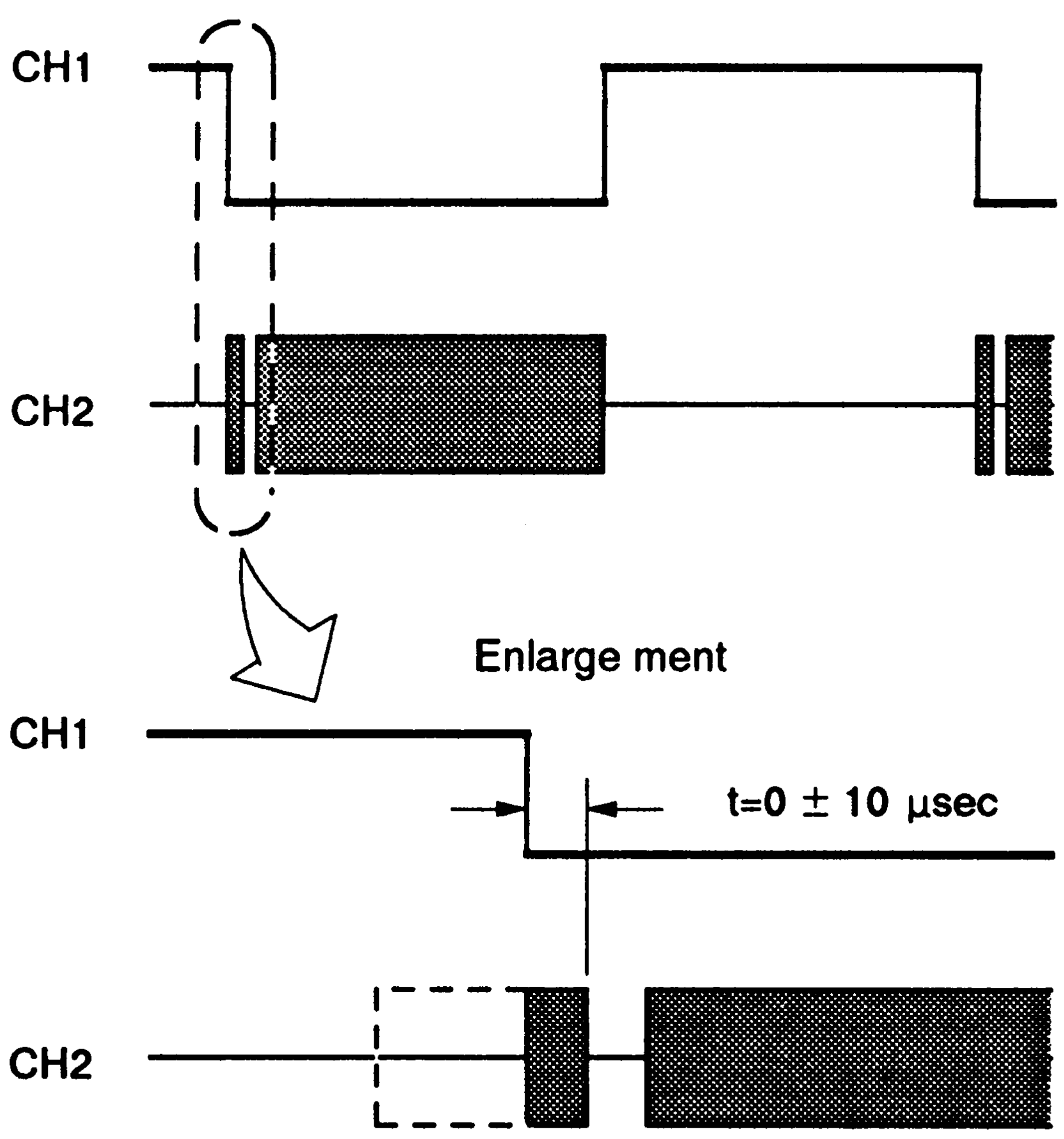


Fig. 7-3-6.

3-5. VIDEO ADJUSTMENTS

The adjustments of the video system must be performed according to the following adjustment procedure.

The color video signal supplied from the pattern generator is used as the video input signal for adjusting the video system in recording mode. Check that the sync signal and the color burst signal satisfy the specification specified during the adjustment set-up shown in Figs. 7-3-2. and 7-3-3.

[Adjusting procedure]

1) Playback frequency characteristics adjustment
2) Flying erase check
3) VXO oscillation frequency check
4) SYNC AGC level adjustment
5) Comb filter adjustment
6) Emphasis input level adjustment
7) DE EMPH level adjustment
8) PB Y out level adjustment
9) Y FM carrier frequency adjustment
10) Y FM deviation adjustment
11) Chroma emphasis adjustment 1
12) Chroma emphasis adjustment 2
13) Comb filter fine adjustment
14) REC Y level adjustment
15) REC L adjustment
16) REC CHROMA level adjustment
17) REC ATF level check

1. Playback Frequency Characteristic Adjustment (VS-111 board)

Eliminate the differences in the head characteristics of each channel. If there are differences, flickers and over modulation noises will be produced.

Note 1: The adjusting element for CH2 is shown in parentheses [ ].

Mode	Playback
Signal	Alignment tape: For frequency characteristic adjustment (WR5-6N)
Measurement Point	CH1: Pin ③ of CN102 (PB RF) EXT TRIG: Pin ④ of CN102 (RF SWP)
Measuring Instrument	Oscilloscope TRIG SLOPE: +, [–]
Adjustment Page	D
Adjustment Address	5E, [63]
Specified Value	3.58 MHz level: 5.5 MHz level= 4: (3 ± 0.3)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of address: 5E [63] of page D, and adjust the level ratio of 3.58 MHz and 5.5 MHz of PB RF output waveform to the specified value.

   Note 2: After each address adjustment, be sure to press the PAUSE button of the adjusting remote commander and memorize the data.

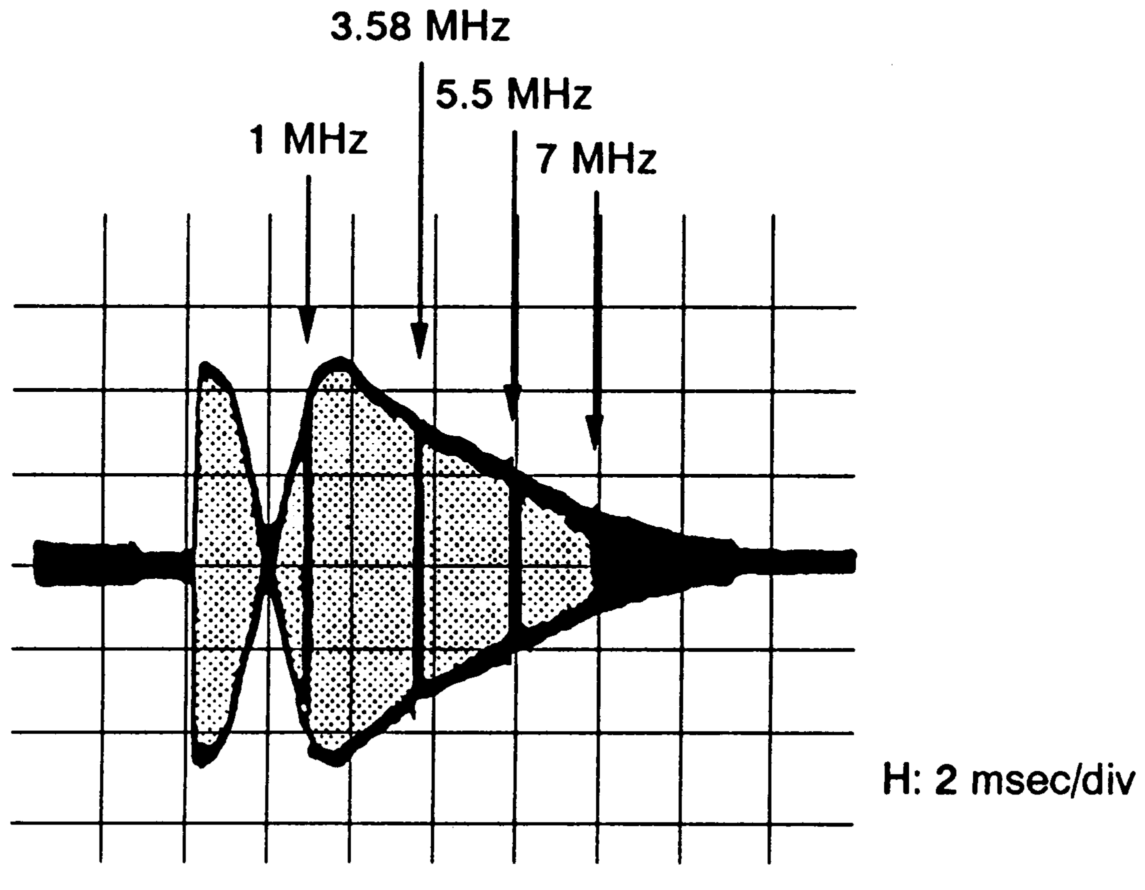


Fig. 7-3-7.

2. Flying Erase Check (VS-111 board)

Mode	Camera record
Signal	Arbitrary
Measurement Point	Pin ⑫ of CN101 (FE (X))
Measuring Instrument	Oscilloscope and frequency counter
Specified Value	Frequency: 8.0 ± 0.5 MHz Voltage: 6.0 ± 1 Vp-p (ME tape) Above 7.0 Vp-p (MP tape)

Checking method:

1) Check that the oscillation frequency and the oscillation voltage satisfieds the specified value.

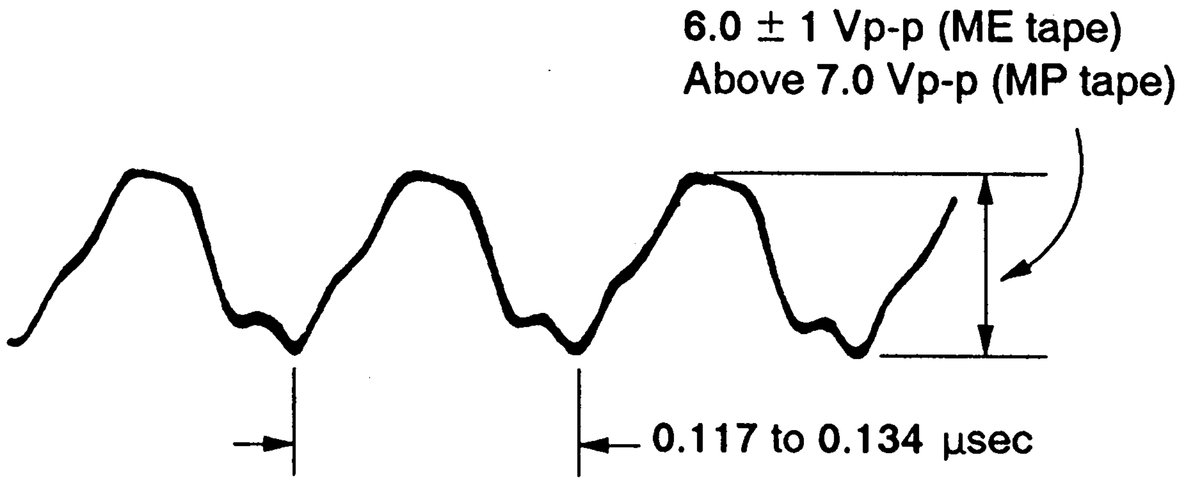


Fig. 7-3-8.

3. VXO Oscillation Frequency Check (VS-111 board)

Mode	Playback
Signal	Color bar
Measurement Point	Pin (61) of IC201 (CL227)
Measuring Instrument	Frequency counter
Specified Value	3579545 ± 50 Hz

Note: Connect the frequency counter via a high impedance (approximately 10 MΩ) and low capacity (below 10 pF) buffer.

Adjusting method:

1) Check that the oscillation frequency of pin (61) of IC201 is 3579545 ± 50 Hz.

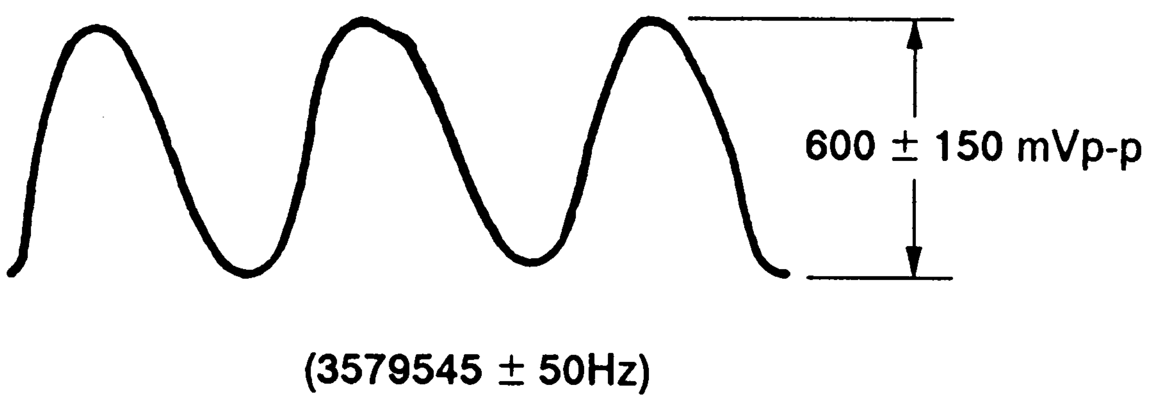


Fig. 7-3-9.

4. SYNC AGC Level Adjustment (VS-111 board)

Adjust so that the Y signal level to be recorded becomes consistent. If it is not consistent, the camera EE image and OA image will be brighter or darker than normal.

Mode	Camera record
Signal	Color bar (Camera input) Note 1
Measurement Point	Pin ⑥ of CN201 (VIDEO I/O) Note 2 (CL298)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	70
Specified Value	A=1.00 ± 0.025V

Note 1: The chroma signal input is not required.

Note 2: Terminate the video out terminal at 75Ω.
75Ω resistor (Part code: 1-247-804-11)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 70, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

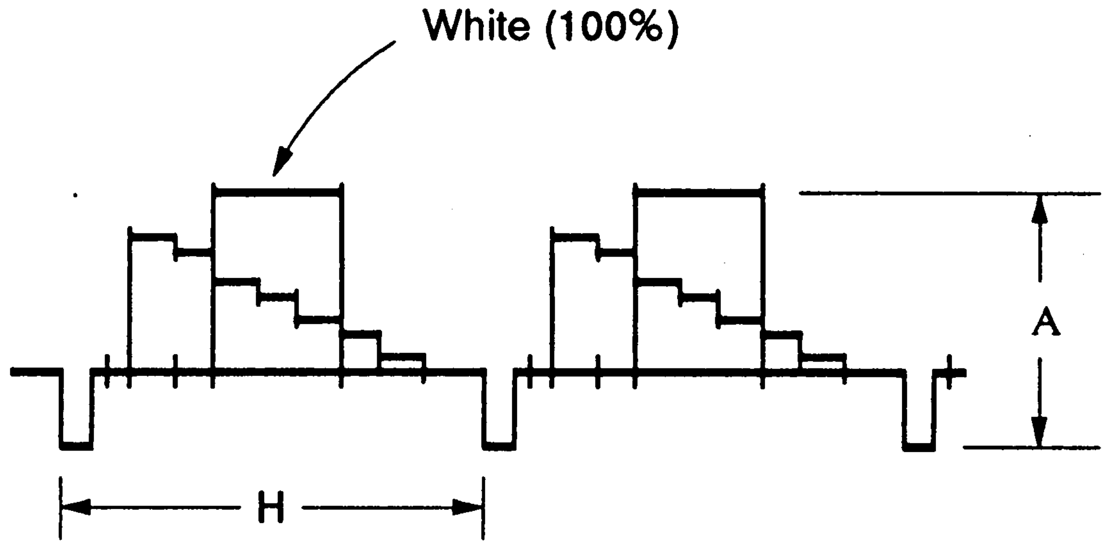
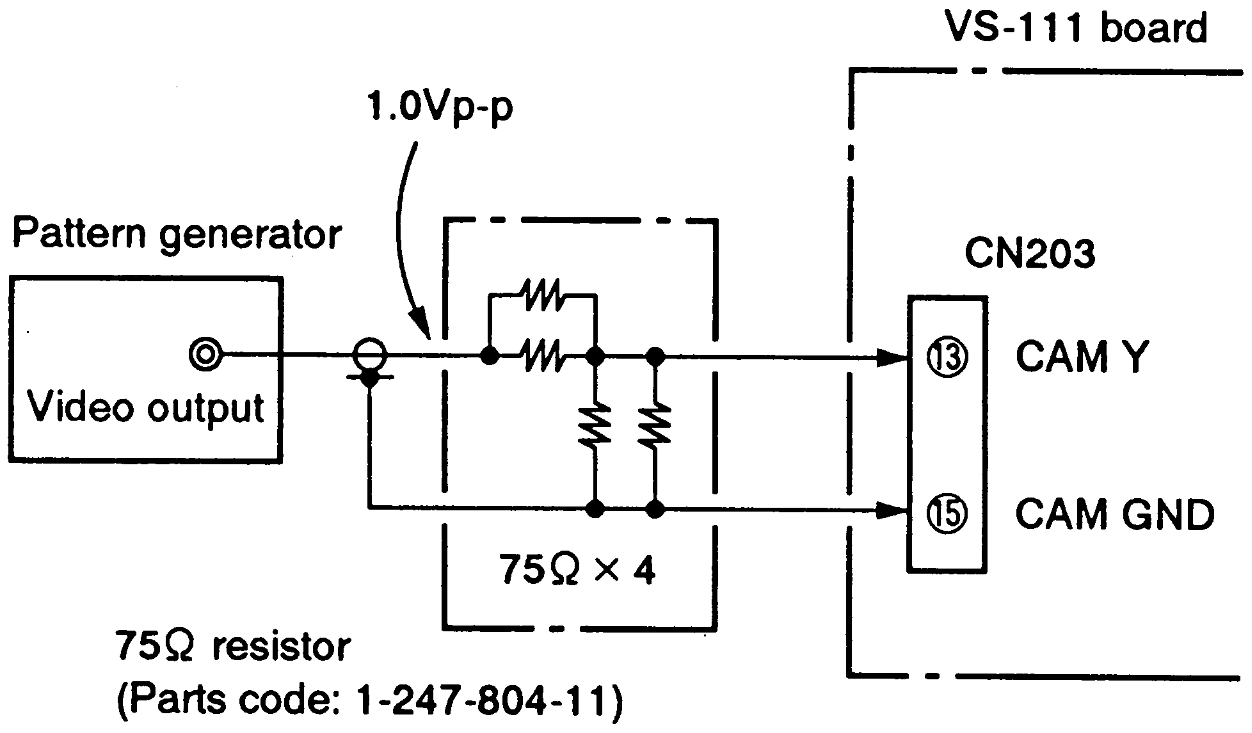


Fig. 7-3-10.

5. Comb Filter Adjustment (VS-111 board)

Mode	Record
Signal	Color bar (Note 1)
Measurement Point	Pin ⑭ of IC201 (Y COMB OUT)
Measuring Instrument	Oscilloscope
Adjusting Element	RV202 (PHASE)
Adjustment Page	D
Adjustment Address	71
Specified Value	Residual chroma component (A) is minimum.

Note 1: Connect the pattern generator as shown in the following figure.



Adjusting method:

1) Set to the VIDEO input mode.
2) Set to the record mode.
3) Set data: 01 to page: 1, address: 00.
4) Set data: 00 to page: 2, address: 00.
5) Set data: 04 to page: 2, address: B0.
6) After memorizing the data of address: 9A of page: 2, set data: 10 to the address.
7) After memorizing the data of address: 9D of page: 2, set data: 30 to the address.
8) Change the data of page: D, address: 71, and adjust the residual chroma component (A) to minimum.
9) Adjust RV202 so that the residual chroma component becames minimum.
10) Repeat 8) and 9).
11) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set the data memorized at step 7) to address: 9D of page: 2.
2) Set the data memorized at step 6) to address: 9A of page: 2.
3) Set data: 00 to page: 2, address: B0.

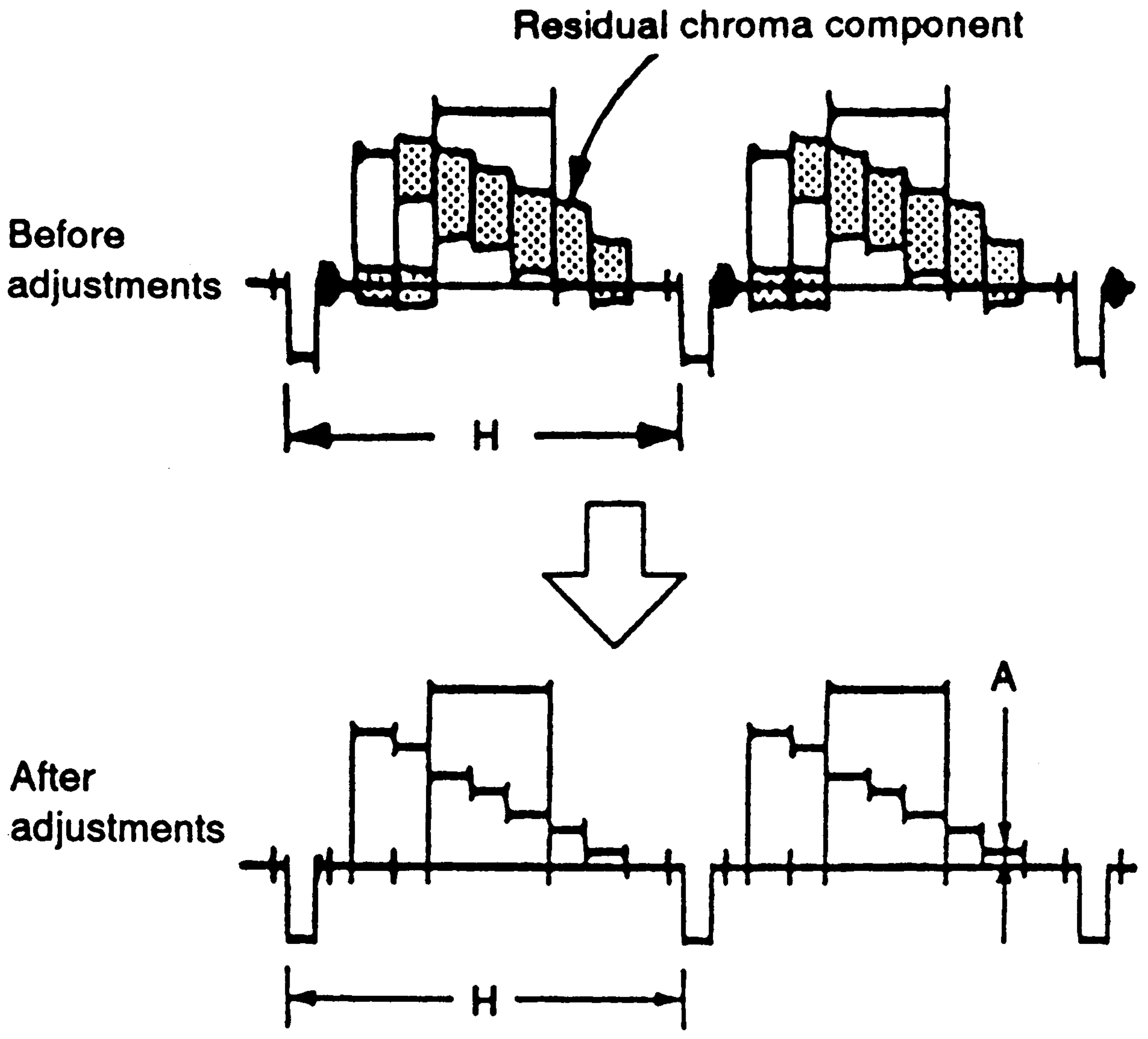

Residual chroma component
Before adjustments
H
After adjustments
A
H

Fig. 7-3-11.

6. Emphasis Input Level Adjustment (VS-111 board)

Y level of emphasis circuit setting. If deviated, this causes too bright or too dark image during play back after recording.

Mode	Camera record
Signal	Color bar (CAMERA input)
Measurement Point	Pin ⑤ of IC201 (EMPH IN) or Pin ⑤ of IC205 (CL204)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	82
Specified Value	A=0.50 ± 0.01V

Note 1: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 82, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

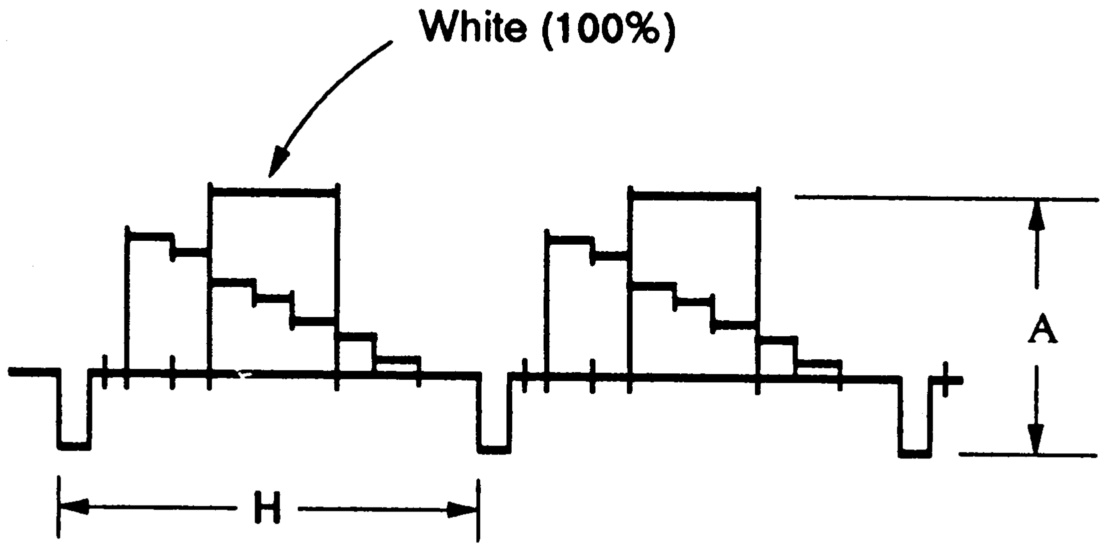

White (100%)
A
H

Fig. 7-3-12.

7. DE EMPH Level Adjustment (VS-111 board)

De-emphasis input level setting. If deviated, this causes excessive brightness or darkness.

Mode	Playback
Signal	Alignment tape: For checking operations Color bar section (WR5-5NSP)
Measurement Point	Pin ㉓ of IC201 (DL IN 1) (CL215)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	87
Specified Value	A=0.54 ± 0.01V

Note 1: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 87, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Perform "PB Y OUT Level Adjustment".

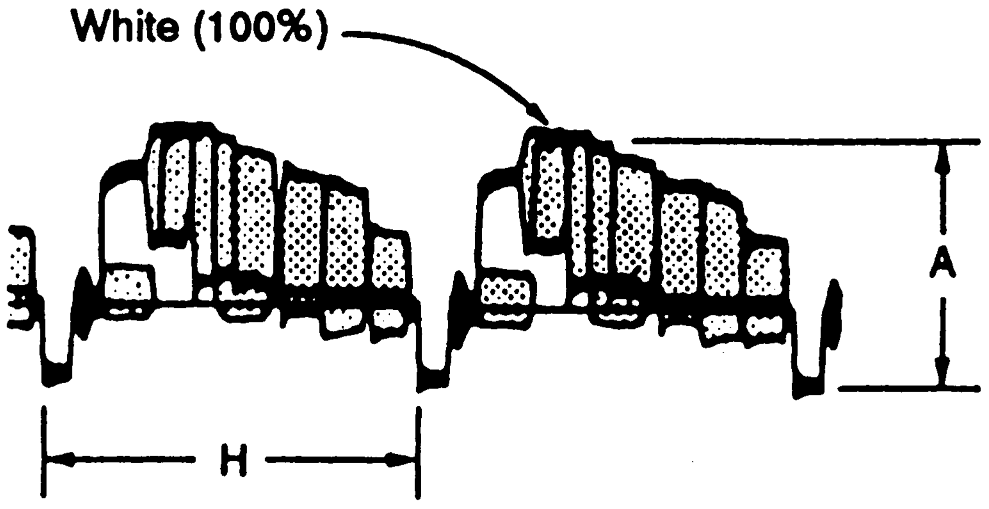


Fig. 7-3-13.

8. PB Y OUT Level Adjustment

PB LINE OUT Y level setting. If deviated, this causes too bright or too dark picture.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Pin ⑥ of CN201 (VIDEO I/O)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	83
Specified Value	A=1.0 ± 0.05V

Note: Terminate the video out terminal at 75Ω.
75Ω resistor (Part code: 1-247-804-11)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 83, and adjust so that the video signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

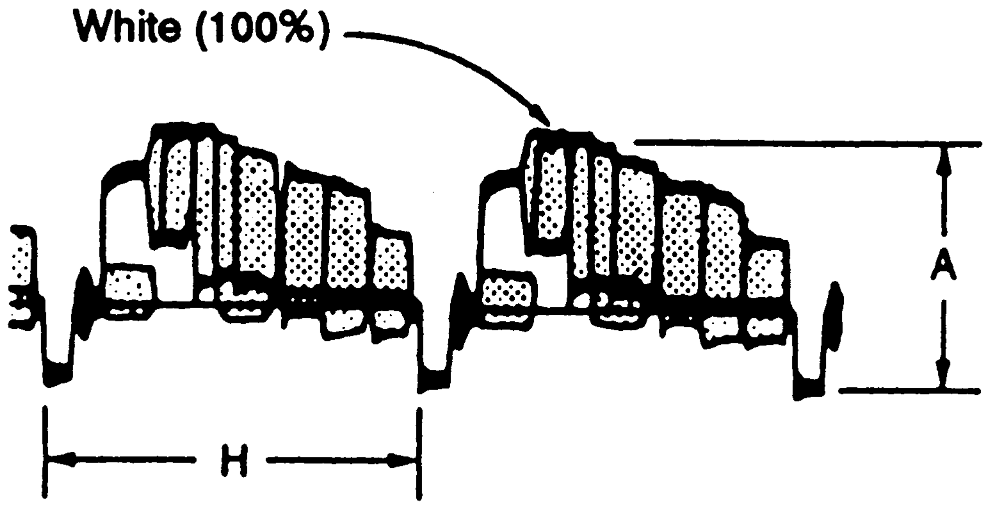


Fig. 7-3-14.

9. Y FM Carrier Frequency Adjustment (VS-111 board)

FM carrier frequency of REC Y setting. If deviated, this caused blurred played back picture or deteriorated resolution.

Mode	Record
Signal	No signal (CAMERA input)
Measurement Point	Pin ㊴ of IC201 (Y RF OUT) (CL304)
Measuring Instrument	Frequency counter
Adjustment Page	D
Adjustment Address	75
Specified Value	4.385 ± 0.01 MHz

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 75, and adjust so that the Y FM carrier frequency becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

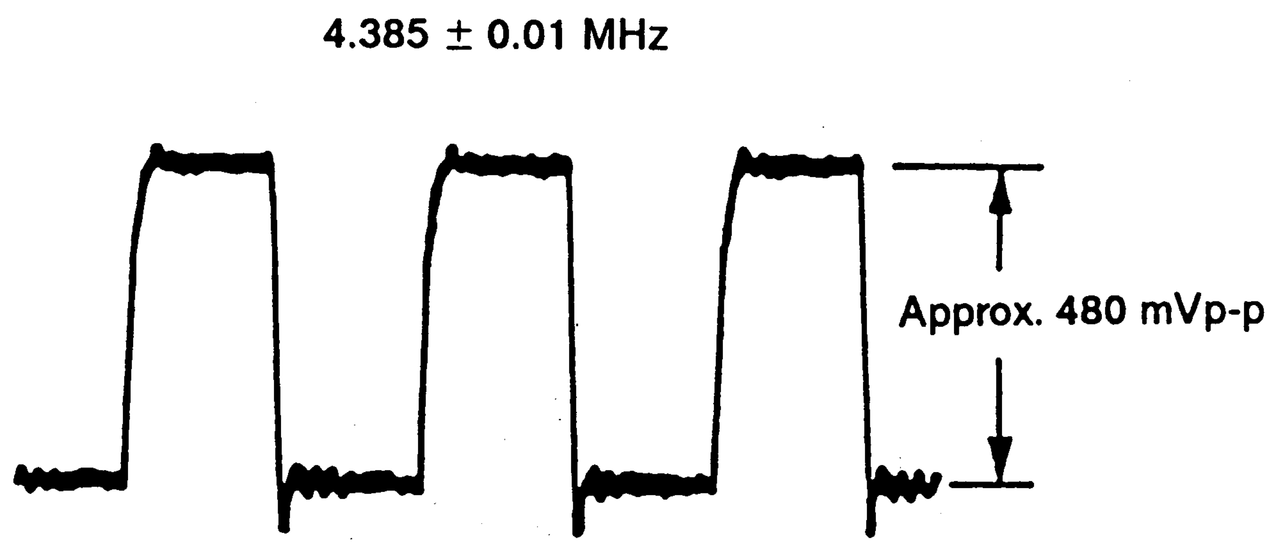


Fig. 7-3-15.

10. Y FM Deviation Adjustment (VS-111 board)

FM deviation of REC Y setting. If deviated, this causes too bright/dark image, or marked occurrence of black picture or deteriorated resolution.

Mode	Record and playback
Signal	Color bar (CAMERA input)
Measurement Point	Pin ㉓ of IC201 (DL IN 1) (CL215)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	77
Specified Value	A=0.54 ± 0.01V

Note 1: Check that "Emphasis Input Level Adjustment", have been completed.

Note 2: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Record the color bar signal.
3) Playback the recorded signal.
4) Check the playback signal level (A).
   Specification:A=0.54 ± 0.01V
5) If the specification is not satisfied, change the data of page: D, address: 77, and repeat steps 2) to 4).

Playback signal level	Changing the data
When smaller than the specified value	Increase
When bigger than the specified value	Decrease

6) Press the PAUSE button of the adjusting remote commander.
7) Perform "Y FM Carrier Frequency Adjustment".

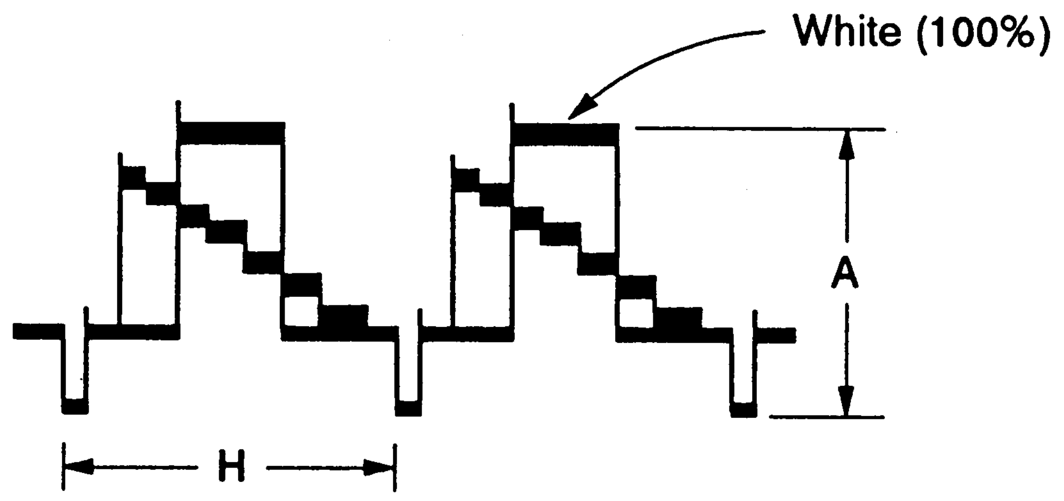


Fig. 7-3-16.

11. Chroma Emphasis Adjustment 1 (VS-111 board)

Emphasis center frequency setting. If deviated, this causes unnatural color.

Mode	Record
Signal	Color bar (CAMERA input)
Measurement Point	Pin ⑧ of IC201 (REC C OUT) (CL216)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	80, 81
Specified Value	Minimum f_0 component

Adjusting method:

1) Set to the record mode.
2) Set data: 01 to page: 00, address: 00.
3) Set data: 00 to page: 2, address: 00.
4) Set data: 04 to page: 2, address: B0.
5) After memorizing the data of address: 9A of page: 2, set data: 02 to the address.
6) Change the data of page: D, address: 80, and adjust so that the amplitude of the latter section of the chroma signal (yellow section) becames minimum.
7) Press the PAUSE button of the adjusting remote commander.
8) Set the same data as address: 80 of page: D to address: 81 of page D.
9) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set the memorized at step 5) to address: 9A of page: 2.
2) Set data: 00 to page: 2, address: B0.

Minimize the amplitude of the latter section of the yellow section.

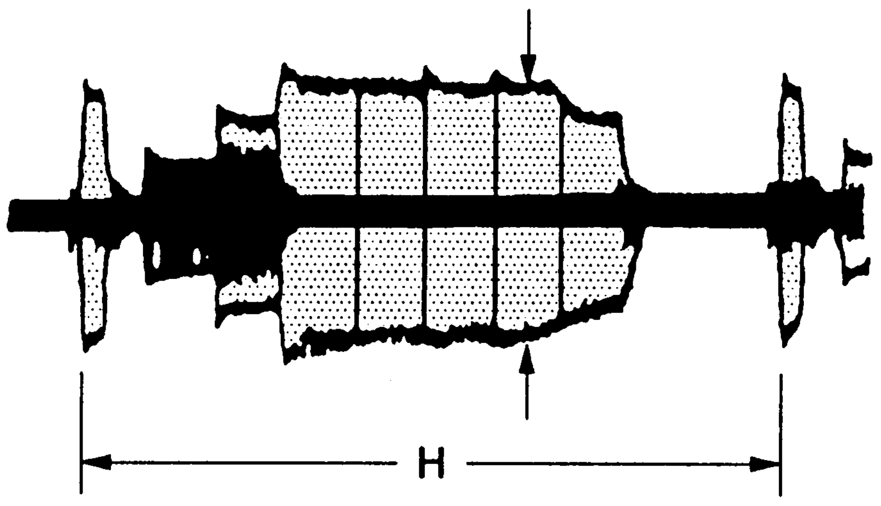


Fig. 7-3-17.

12. Chroma Emphasis Adjustment 2 (VS-111 board)

Emphasis center frequency setting. If deviated, this causes unnatural color.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	D
Adjustment Address	81, 80
Specified Value	The path from the blue luminance point to black luminance point should be a straight line.

Adjusting method:

1) Set data: 01 to page: 00, address: 00.
2) Change the data of page: D, address: 81, and adjust so that the path from the blue luminance point to black luminance point becames a straight line.
3) Press the PAUSE button of the adjusting remote commander.
4) Set the same data as address: 81 of page: D to address: 80 of page: D.
5) Press PAUSE button of the adjusting remote commander.

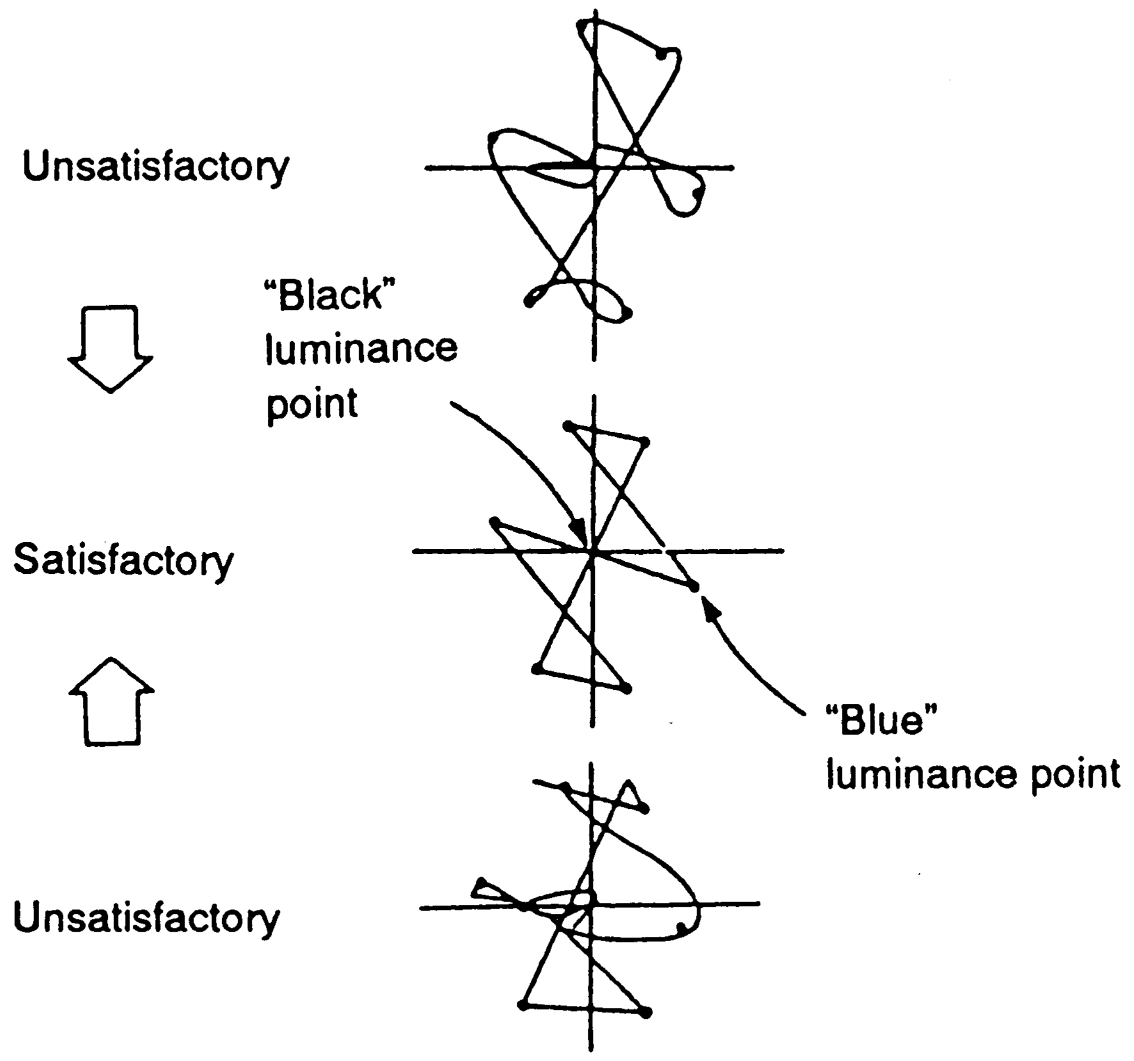


Fig. 7-3-18.

13. Comb Filter Fine Adjustment (VS-111 board)

Set the level and phase of the 1H delayed signal for the comb filter. If deviated, this causes marked occurrence of beets in played back picture.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjusting Element	RV202 (PHASE)
Adjustment Page	D
Adjustment Address	71
Specified Value	Minimum color luminance point movement when the "Edit" switch is turned on/off

Note 1: Turn the edit ON/OFF at the menu screen.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Minimize the movements of the color luminance point when the edit is on/off with RV202.
3) Change the data of page: D, address: 71 and minimize the movements of the color luminance point when the edit is on/off
4) Press the PAUSE button of the adjusting remote commander.
5) Repeat steps 2) to 4).

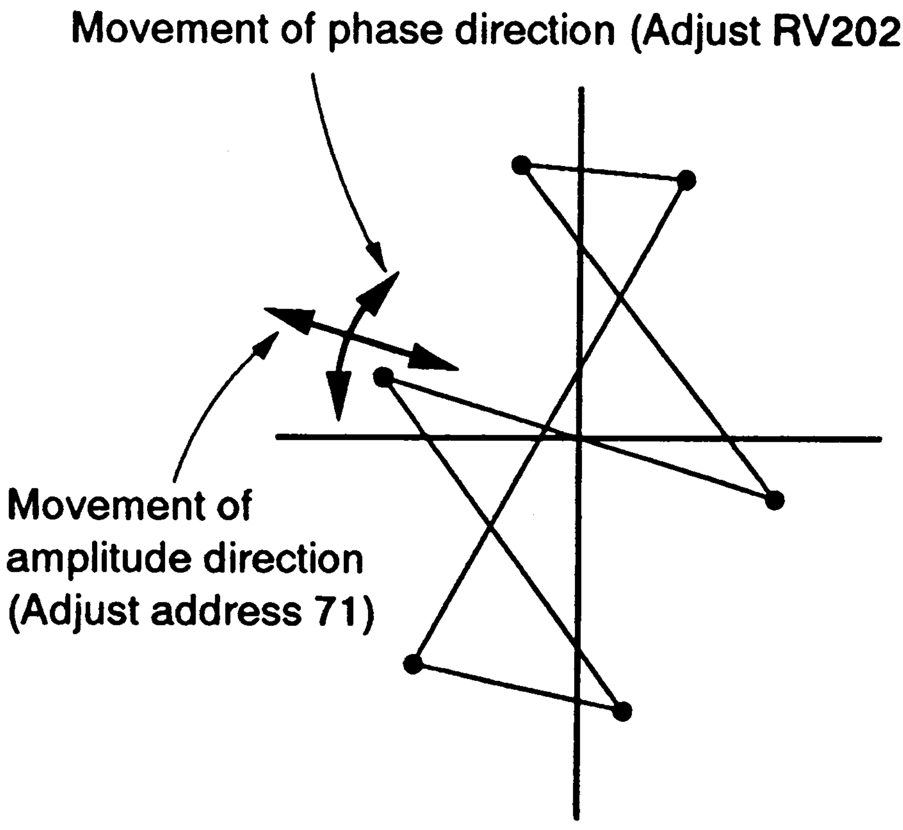

Movement of phase direction (Adjust RV202)
Movement of amplitude direction (Adjust address 71)

Fig. 7-3-19.

14. REC Y Level Adjustment (VS-111 board)

Recording level of luminance signal setting. If deviated, this causes black stretch over modulation noise or color shade.

Mode	Record
Signal	No signal
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope Board width limit: 20 MHz
Adjustment Page	D
Adjustment Address	42, 43, 46, 47
Specified Value	A=145 ± 5 mVp-p

Note: Use a normal MP type tape.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Set data: FF to address: 43 of page: D, and press the PAUSE button of the adjusting remote commander.
3) Change the data of page: D, address: 47, and adjust so that REC Y level (A) becomes the specified value.
4) Press the PAUSE button of the adjusting remote commander.
5) Set data to address: 42, 43, 46 of page: D as shown in following table.

(Be sure to press the PAUSE button of the adjusting remote commander after setting each data.)

Address	Data
42	Same data as address: 47
43	Same data as address: 47
46	Same data as address: 47

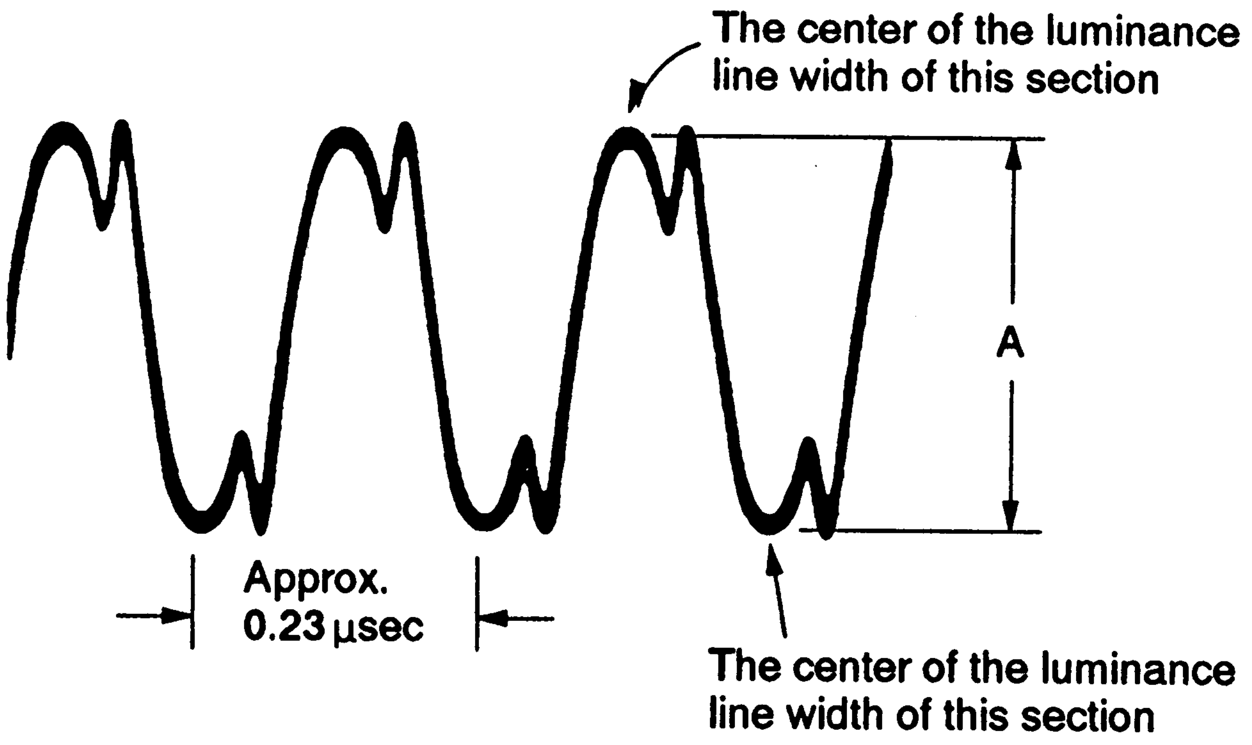

The center of the luminance line width of this section
A
Approx. 0.23 μsec
The center of the luminance line width of this section

Fig. 7-3-20.

15. REC L Adjustment (VS-111 board)

Set the recording levels of the REC AFM signal and REC ATF signal. If the level is too low, the audio S/N will deteriorate, tracking will not be stable, or SP/LP will not be discriminated properly. If too high, color beets will be produced on the self-recording/playback image.

Mode	Record
Signal	No signal (VIDEO input)
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	38, 39, 3A, 3B
Specified Value	A=6.7 ± 1.0 mVp-p

Note 1: Use a MP type tape.
Note 2: AU-168 board is required for this adjustment.
Note 3: Don't insert any plug into the right audio terminal.

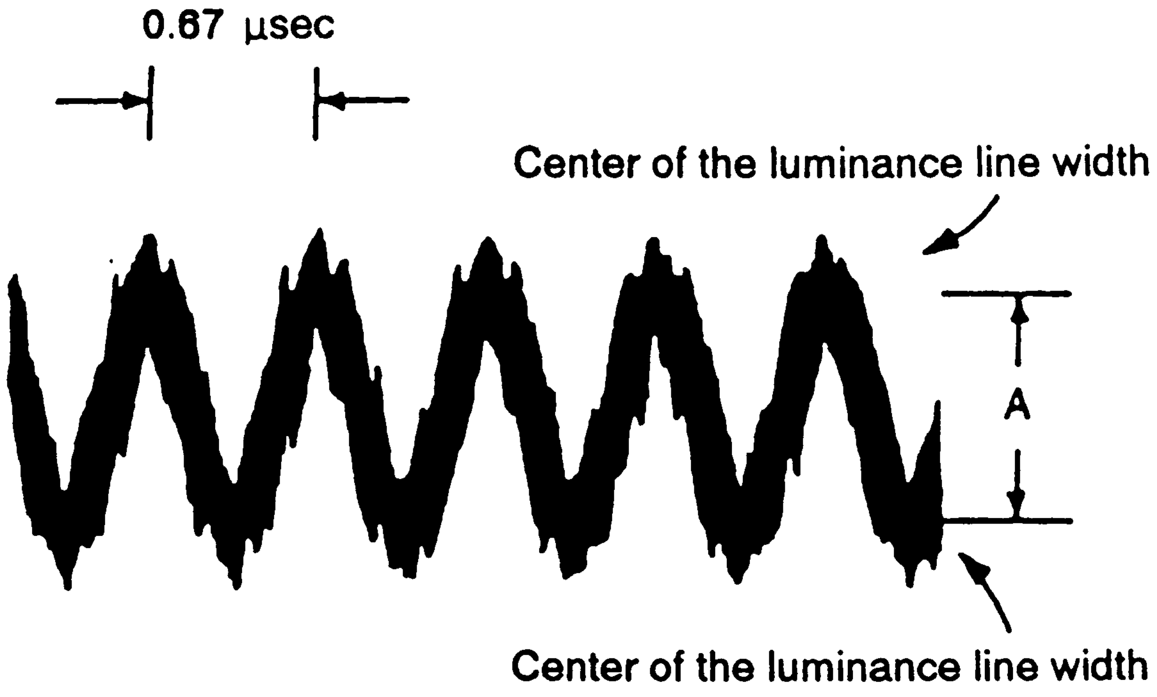

0.67 μsec
Center of the luminance line width
A
Center of the luminance line width

Fig. 7-3-21.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Connect Pin ⑤ of IC508 and GND with a 0.01 μF capacitor. (Parts code: 1-101-004-00)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 3B, and adjust so that the REC AFM signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Read the data of page: D, address: 3B, and this data named D3B.
5) Set data: D3B to address: 39 of page D.
6) Press the PAUSE button of the adjusting remote commander.
7) Convert D3B to decimal notation, and obtain D3B′. (Refer to Table 7-1-3. "Hexadecimal notation-decimal notation conversion table")
8) Culculate D3A′ using following equation (decimal notation calculation).
   D3A′=D3B′−7
9) Convert D3A′ to hexadecimal notation, and obtain D3A.
10) Set data: D3A to address: 3A of page D.
11) Press the PAUSE button of the adjusting remote commander.
12) Set data: D3A to address: 38 of page D.
13) Press the PAUSE button of the adjusting remote commander.
14) Perform "REC CHROMA Level Adjustment".

16. REC CHROMA Level Adjustment (VS-111 board)

Set REC CHROMA signal level. If it is lower than its normal level, chroma signal noise in played back picture will increase. If it is set higher, Y signal noises will increase and white modulation noises will be prodused.

Mode	Record
Signal	Color bar (VIDEO input)
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	33, 32, 37, 36
Specified Value	A=29 ± 3 mVp-p

Note 1: Use a MP type tape.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Connect Pin ⑤ of IC508 and GND with a 0.01 μF capacitor. (1-101-004-00)
3) Disconnect AU-168 board.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 33, and adjust so that the REC CHROMA signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Read the data of page: D, address: 33, and this data named D33.
5) Set data: D33 to address: 32 of page D.
6) Press the PAUSE button of the adjusting remote commander.
7) Set data: D33 to address: 36 of page D.
8) Press the PAUSE button of the adjusting remote commander.
9) Set data: D33 to address: 37 of page D.
10) Press the PAUSE button of the adjusting remote commander.

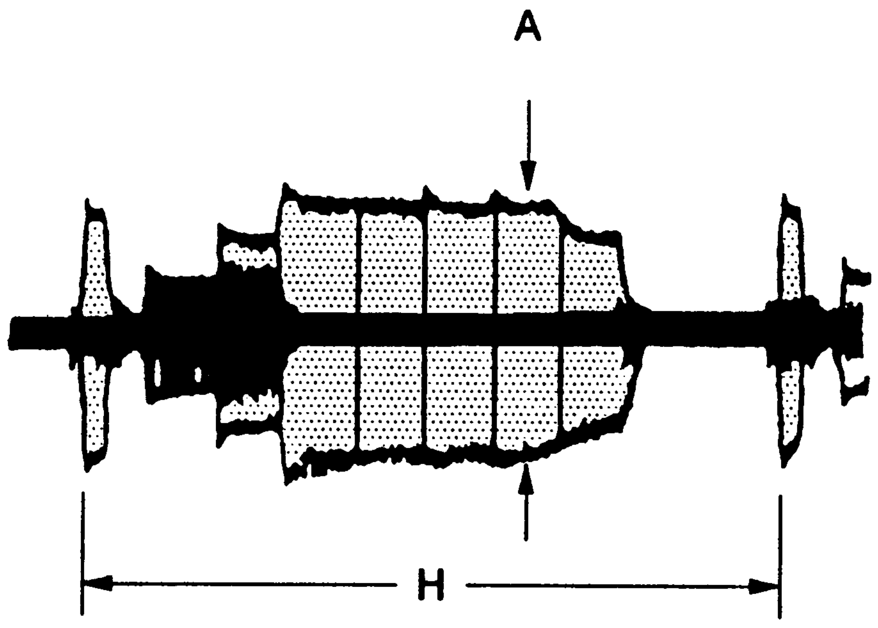


Fig. 7-3-22.

17. REC ATF Level Check (VS-111 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Specified Value	A=6.4 ± 1.5 mVp-p

Note 1: Use a MP type tape.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Disconnect AU-168 board.

Adjusting method:

1) Check that the REC ATF signal level (A) satisfise the specified value.

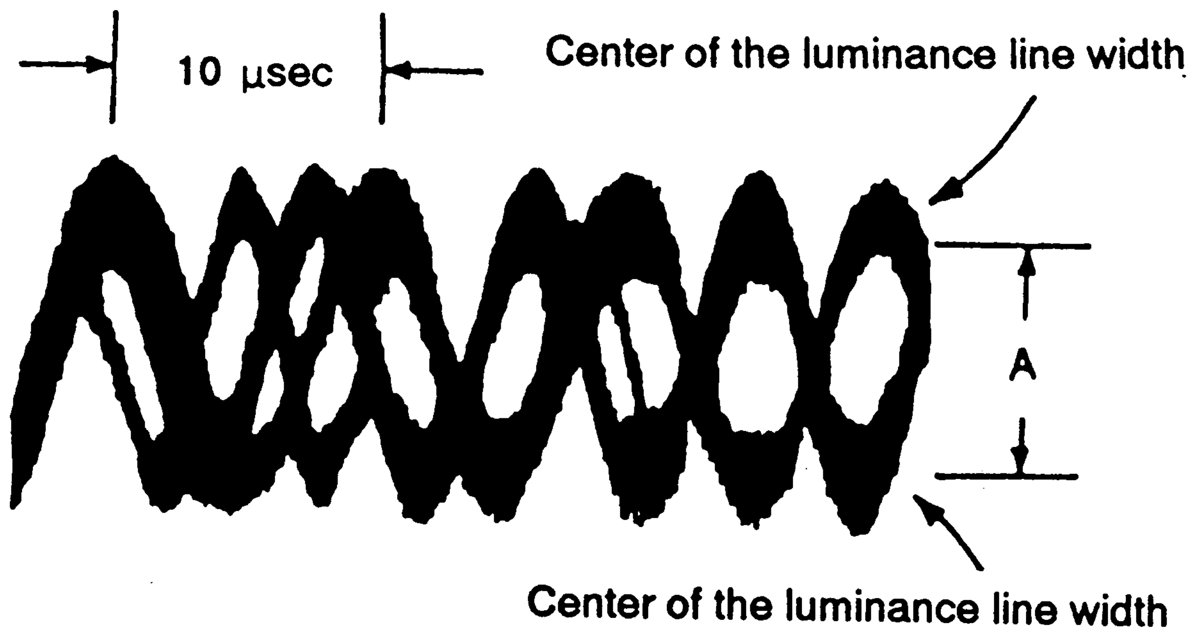

10 µsec
Center of the luminance line width
A
Center of the luminance line width

Fig. 7-3-23.

3-5. AUDIO SYSTEM ADJUSTMENT

- Perform the adjustment using the color bar signal as a video signal input for Pin ㉚ of IC201 on VS-111 board.

[Connecting the measuring instruments for the audio]
Connect the audio system measuring instruments in addition to the video system measuring instruments as shown in Fig. 7-3-24, and perform adjustments at the power switch [player] position.

Set the Hi-Fi SOUND switch in the menu display to the following position unless specified otherwise.
- Stereo position

Note: 1) When inputting the audio signal, input the same signal to both L, and R channels, unless specified otherwise.
2) Be sure to insert the plug (shorting plug or dummy plug, etc.) into the audio terminal (right). If the plug is not inserted, the unit will be set into the monaural mode, and correct adjustments cannot be carried out.
(Monaural mode)
During recording ·· REC AFM RF1.7 MHz carrier will not be output.
During playback ·· The L+R signal will be output from the audio terminal (left).
3) The items to be adjusted for the R channel will be indicated within the [ ], in regard to the adjusting items to be adjusted for both L and R channels.

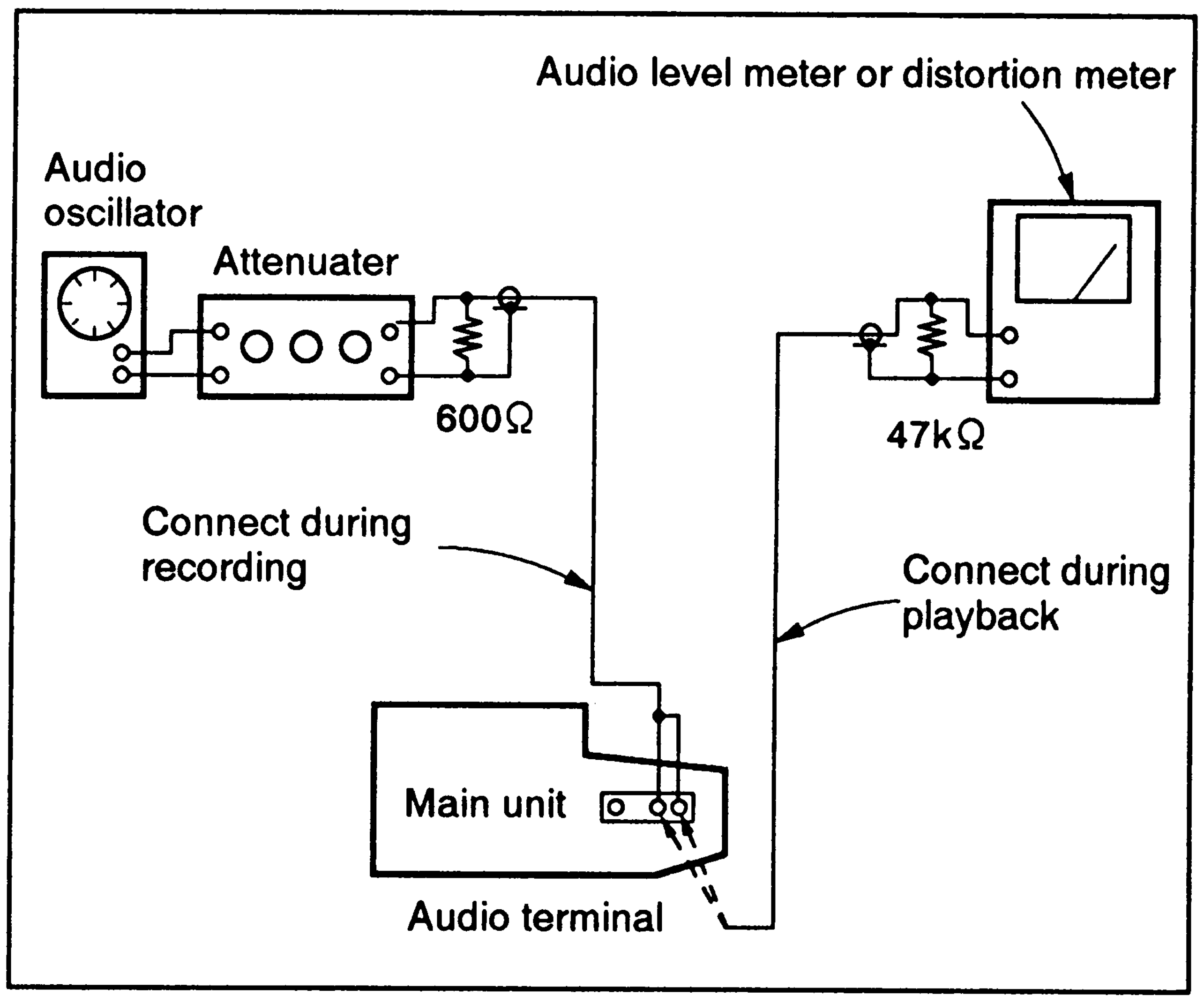


Fig. 7-3-24.

[Adjustment Procedure]
1) E-E output level check
2) REC matrix L–R adjustment
3) REC matrix L+R check
4) 1.5 MHz deviation adjustment
5) 1.7 MHz deviation adjustment
6) Overall level characteristics, distortion check
7) Separation check
8) Overall noise level check

1. E-E Output Level Check (AU-168 board)

Mode	Record
Signal	400 Hz, –7.5 dBs audio input terminal right [left]
Measurement Point	Pin ㊾ of IC1301 [Pin ㊿ of IC1301]
Measuring Instrument	Oscilloscope
Specified Value	925^{+240}_{-190} mVp-p (–7.5 ± 2 dBs)

Checking method:
1) Check that the 400 Hz signal level satisfies the specified value.

2. Matrix L-R Adjustment (AU-168 board)

Adjust the audio matrix. If improper, this causes deteriorated separation (with stereo signal).

Mode	Record
Signal	400 Hz, –7.5 dBs Input to both left and right terminals of the audio input terminal
Measurement Point	Pin ⑤ of IC1301
Measuring Instrument	Oscilloscope (Use 1:1 probe)
Adjustment Page	D
Adjustment Address	8C, 8D
Specified Value	0 ± 20 mVp-p

Adjusting method:
1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 8C, and minimize the 400 Hz signal level.
3) Press the PAUSE button of the adjusting remote commander.
4) Set the same data as address: 8C of page: D to address: 8D of page: D.
5) Press the PAUSE button of the adjusting remote commander.

3. REC Matrix L+R Check (AU-168 board)

Mode	Record
Signal	1. 400 Hz, -7.5 dBs: Audio input terminal left No signal: Audio input terminal right 2. No signal: Audio input terminal left 400 Hz, -7.5 dBs: Audio input terminal right
Measurement Point	Pin ㊹ of IC1301
Measuring Instrument	Oscilloscope
Specified Value	The level difference is 0 ± 10 mVp-p when only the left terminal is input and when only the right terminal is input.

Note: When measuring the signal level of pin ㊹ of IC1301, wait for more than 1 minute after signal input before measuring. (To stabilize the AGC)

Adjusting method:

1) Input the 400 Hz, -7.5 dBs signal only to the audio input terminal (left). (Insert the shorting plug to the audio input terminal (right).)
2) Read the 400 Hz signal level of pin ㊹ of IC1301, and take it down. (Approximately 250 mVp-p)
3) Input the 400 Hz, -7.5 dBs signal only to the audio input terminal (right). (Insert the shorting plug to the audio input terminal (left).)
4) Check that the 400 Hz signal level of pin ㊹ of IC1301 is (the value that was taken down at step 2) ± 10 mVp-p.

4. 1.5 MHz Deviation Adjustment

Adjusts the 1.5 MHz AFM signal deviation. If improper, this causes deteriorated separation with Alignment tape (with stereo signal) and the playback level will differ from that of other unit.

Mode	Playback
Signal	Alignment tape: For checking the operation (WR5-5NSP)
Measurement Point	Audio output terminal left or right
Measuring Instrument	Oscilloscope, Level meter
Adjustment Page	D
Adjustment Address	8F
Specified Value	-7.5 ± 0.5 dBs

Adjusting method:

1) Set data: 01 to page:1, address: 00.
2) Change the data of page: D, address: 8F, and adjust so that the 400 Hz signal level becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

5. 1.7 MHz Deviation Adjustment

Adjust the 1.7 MHz AFM deviation. If improper, this causes deteriorated separation (with stereo signal).

Mode	Playback
Signal	Alignment tape: AFM stereo for checking operation (WR5-9NS) Stereo (color bar) section
Measurement Point	Audio output terminal right
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	8E
Specified Value	Cross talk component is below 30 mVp-p

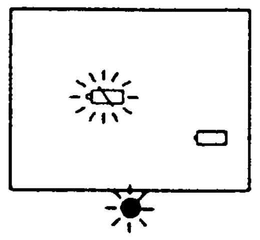
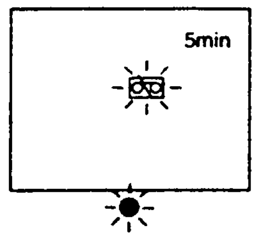
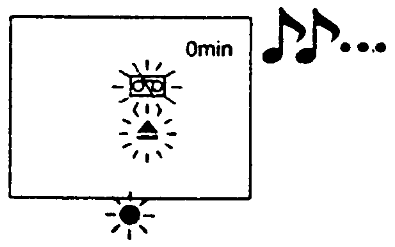
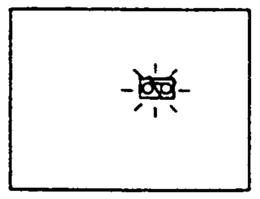
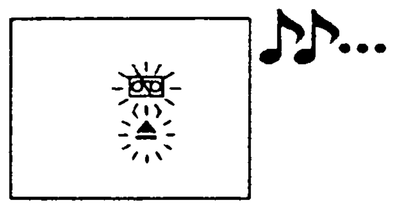
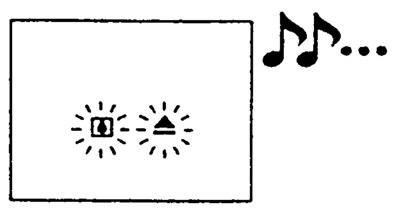
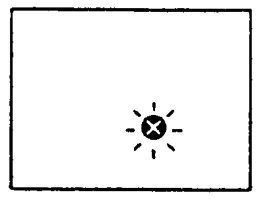
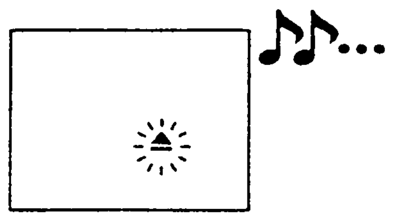
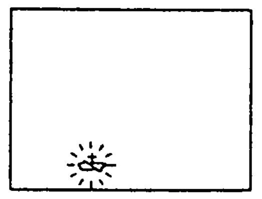
Adjusting method:

1) Set data: 01 to page:1, address: 00.
2) Change the data of page: D, address: 8E, and minimize the cross talk component (400 Hz).
3) Press the PAUSE button of the adjusting remote commander.

Indicators in the Viewfinder

Warning Indicators

If indicators flash in the viewfinder or a caution lamp on the camcorder flashes, check the following:
♪ : you can hear the beep sound when the BEEP is set to ON (**CCD-FX640** only).

1 	2 	3 
4 	5 	6 
7 	8 	9 

1 **The battery is weak or dead.**
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

2 **The tape is near the end.**
The flashing is slow.

3 **The tape has run out.**
The flashing becomes rapid.

4 **No tape has been inserted.**

5 **The tab on the tape is out (red).**

6 **Moisture condensation has occurred.** (p. 37)

7 **The video heads may be contaminated.** (p. 38)

8 **Some other trouble has occurred.**
Disconnect the power source and contact your Sony dealer or local authorized facility.

9 **The lithium battery is weak or is not installed.** (p. 35)

Ref.No.	Part No.	Description	Remark
		MISCELLANEOUS *************	
8	1-467-647-11	SWITCH BLOCK, CONTROL (F-VR)	
117	1-467-648-11	SWITCH BLOCK, CONTROL (CK)	
165	1-643-806-11	FP-539 FLEXIBLE BOARD	
201	1-467-649-11	SWITCH BLOCK, CONTROL (FK)	
207	1-691-471-11	CONNECTOR, TRANSLATION 11P	
211	1-652-452-11	FP-166 FLEXIBLE BOARD	
219	1-652-453-11	FP-176 FLEXIBLE BOARD	
222	1-651-891-11	FP-52 FLEXIBLE BOARD	
253	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
253	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
253	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
254	1-651-904-11	FP-97 FLEXIBLE BOARD	
258	1-651-890-11	FP-49 FLEXIBLE BOARD	
264	1-547-735-51	FILTER BLOCK, OPTICAL	
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
814	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
871	1-641-643-12	FP-444 FLEXIBLE BOARD	
872	1-691-254-13	CONNECTOR, TRANSLATION 10P	
874	1-641-639-13	FP-442 FLEXIBLE BOARD	
875	1-645-271-11	FP-575 FLEXIBLE BOARD	
BL951	1-519-746-61	TUBE, FLUORESCENT (0.7 INCH)	
D802	8-719-984-02	LED BR4371F (TALLY)	
IC691	A-7030-373-A	CCD BLOCK ASSY (059V SERVICE) (CCD IMAGER)	
J201	1-537-415-11	TERMINAL BOARD	
LCD901	8-753-011-00	LCX003BK-1	
M002	A-7091-800-A	MICROPHONE UNIT	
M003	A-7091-800-A	MICROPHONE UNIT	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-12	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY (Z), LM (LOADING)	
M905	1-698-364-01	MOTOR ASSY, FOCUS	
M906	1-698-363-01	MOTOR ASSY, ZOOM	
M907	3-708-888-01	METER, IG (IRIS)	
M908	3-708-889-01	MOTOR ASSY, FOCUS	
M909	3-708-887-01	MOTOR ASSY, ZOOM	
M910	3-708-898-01	IRIS ASSY	
M911	3-708-897-01	MOTOR ASSY, FOCUS	
M912	3-708-896-01	MOTOR ASSY, ZOOM	
S001	1-572-986-11	SWTICH, ROTARY (ENCODER)	
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (REC PROOF, ME/MP, MP/MP-HG)	
S005	1-570-771-21	SWITCH (C DOWN)	
SE691	1-810-024-31	SENSOR, ANGULAR VELOCITY	
SE692	1-810-024-41	SENSOR, ANGULAR VELOCITY	
W500	1-651-889-11	FP-48 FLEXIBLE BOARD	
W501	1-642-186-11	FP-437 FLEXIBLE BOARD	

****

Be sure to read "Note on the CCD Imager replacement" on page 4-6 when changing the CCD imager.

Ref.No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS ********************************	
	1-467-574-71	REMOTE COMMANDER (RMT-708)	
	1-575-334-11	CORD, CONNECTION (A/V connecting cable (stereo), 1.5m)	
	3-798-592-21	MANUAL, INSTRUCTION (ENGLISH)	(CCD-FX240/FX340/FX640)
	3-947-969-21	BELT (S), SHOULDER	
*	3-958-571-01	CUSHION, LOWER	
*	3-958-572-01	CUSHION, ACC	
*	3-962-863-21	INDIVIDUAL CARTON	
**	AC-V25A/V25B/V25C	AC POWER ADAPTOR	
***	NP-55	BATTERY PACK	

Note.
** MARK PARTS IS AVAILABLE FOR REPAIR SERVICE.
*** MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.

****

****
HARDWARE LIST
****

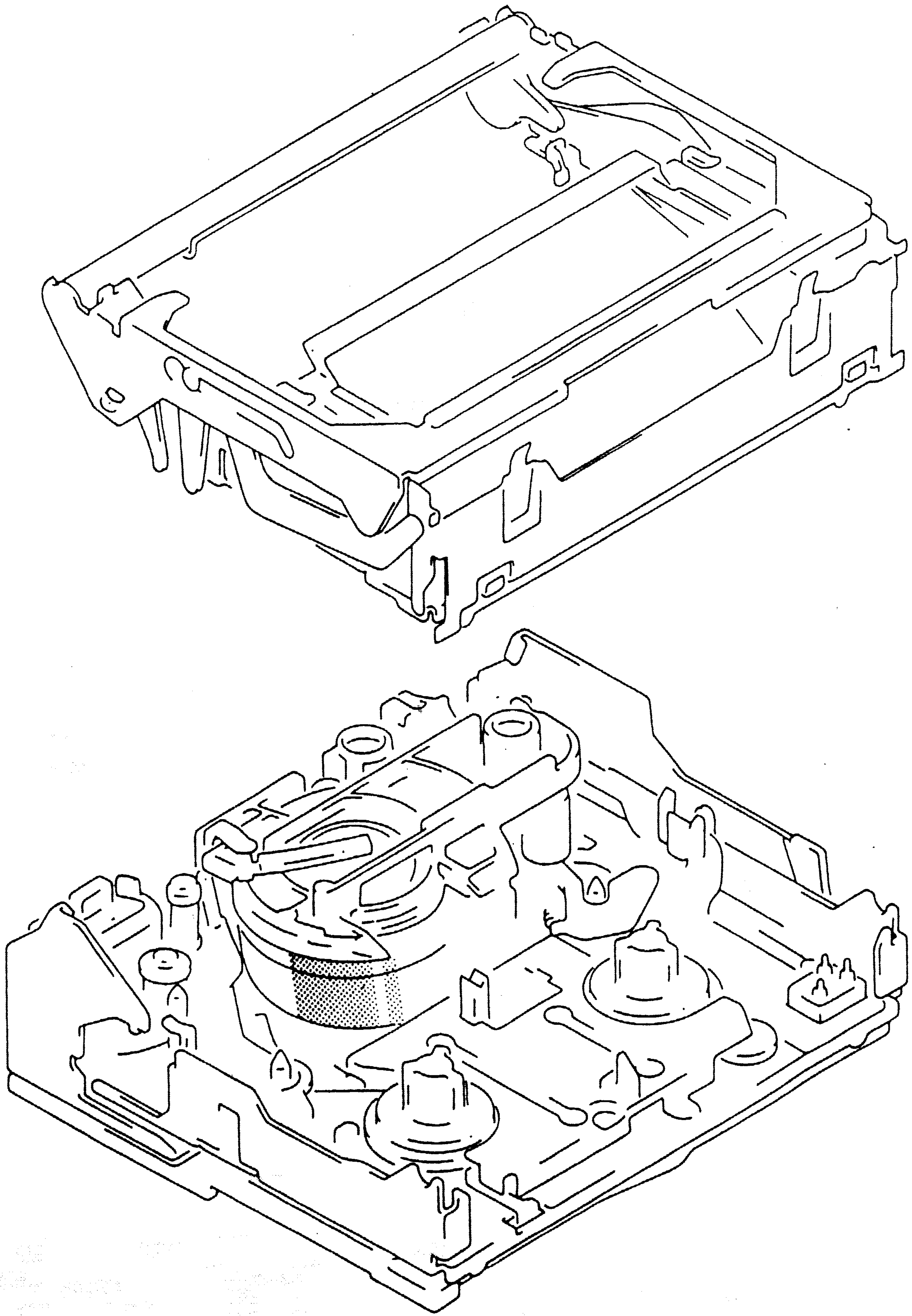
Ref.No.	Part No.	Description	Remark
#1	7-627-553-47	PRECISION SCREW +P 2X4 TYPE 3	

8 mm Video MECHANICAL ADJUSTMENT MANUAL IV

A MECHANISM

Video 8

File with the SERVICE MANUAL



8 VIDEO RECORDER

SONY®

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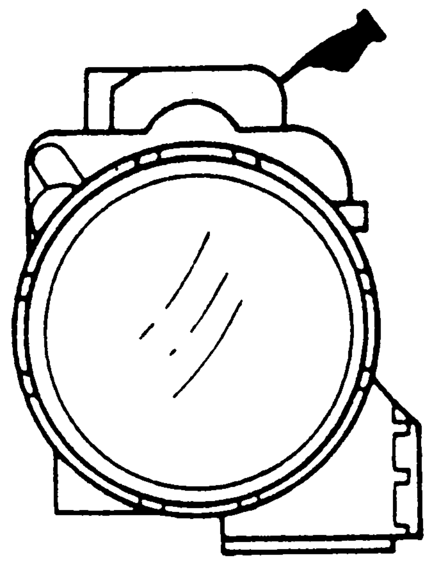
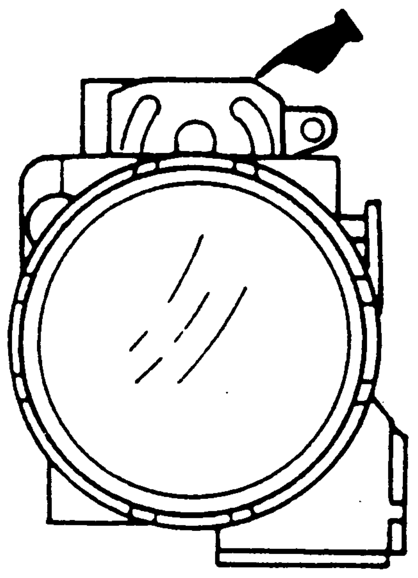
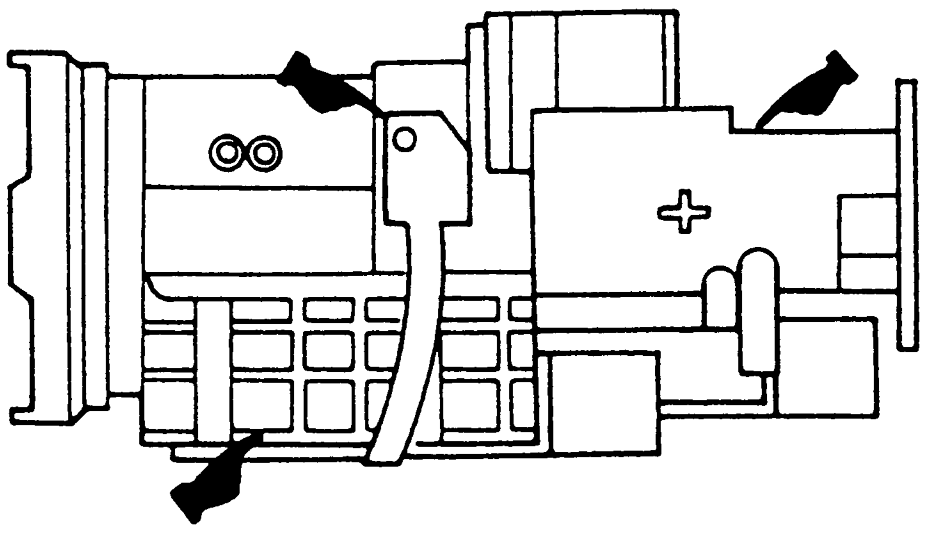
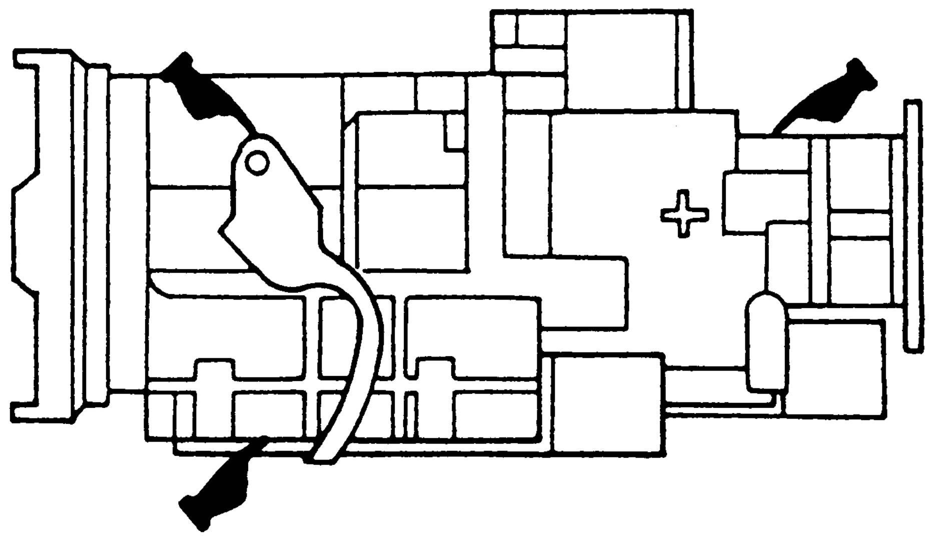
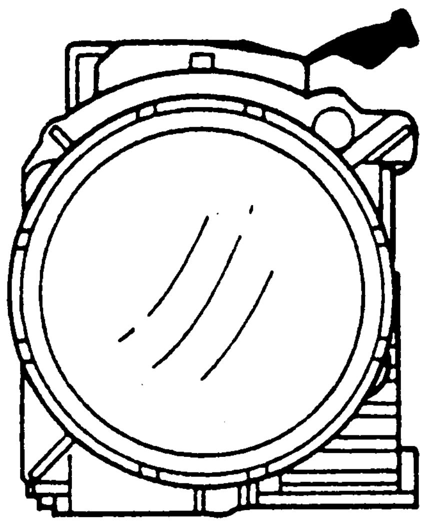
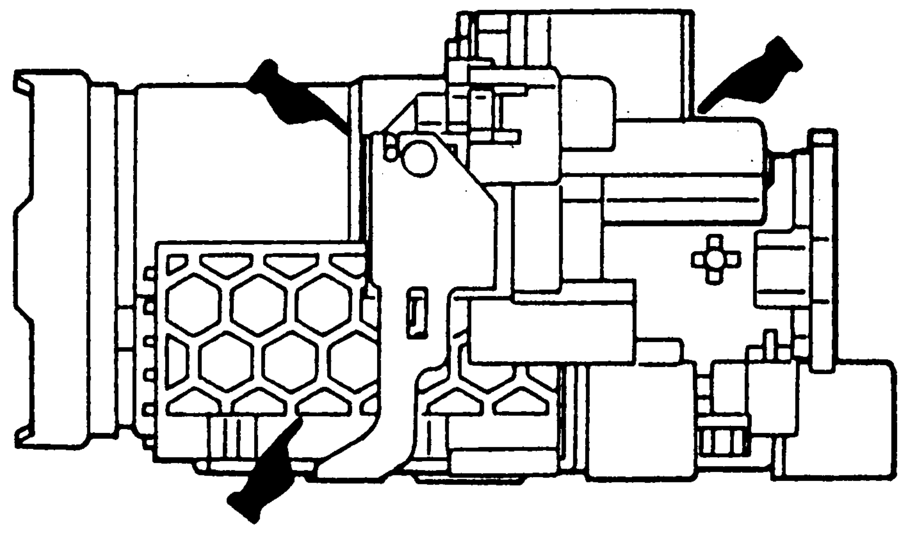
[Zoom lens]

This unit employs three types of lens.
Note that the lenses are interchangeable, however their components are not.

Differentiating the lens ☛ : difference point

TYPE I (LSV-140A)	TYPE II (VCL-5412WA)
From the front of the lens 	From the front of the lens 
From the right side of the lens (as seen from the front) 	From the right side of the lens (as seen from the front) 

TYPE III (VCL-5412WB)
From the front of the lens 
From the right side of the lens (as seen from the front) 

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There is the color reproduction standard frame at the back of the book.

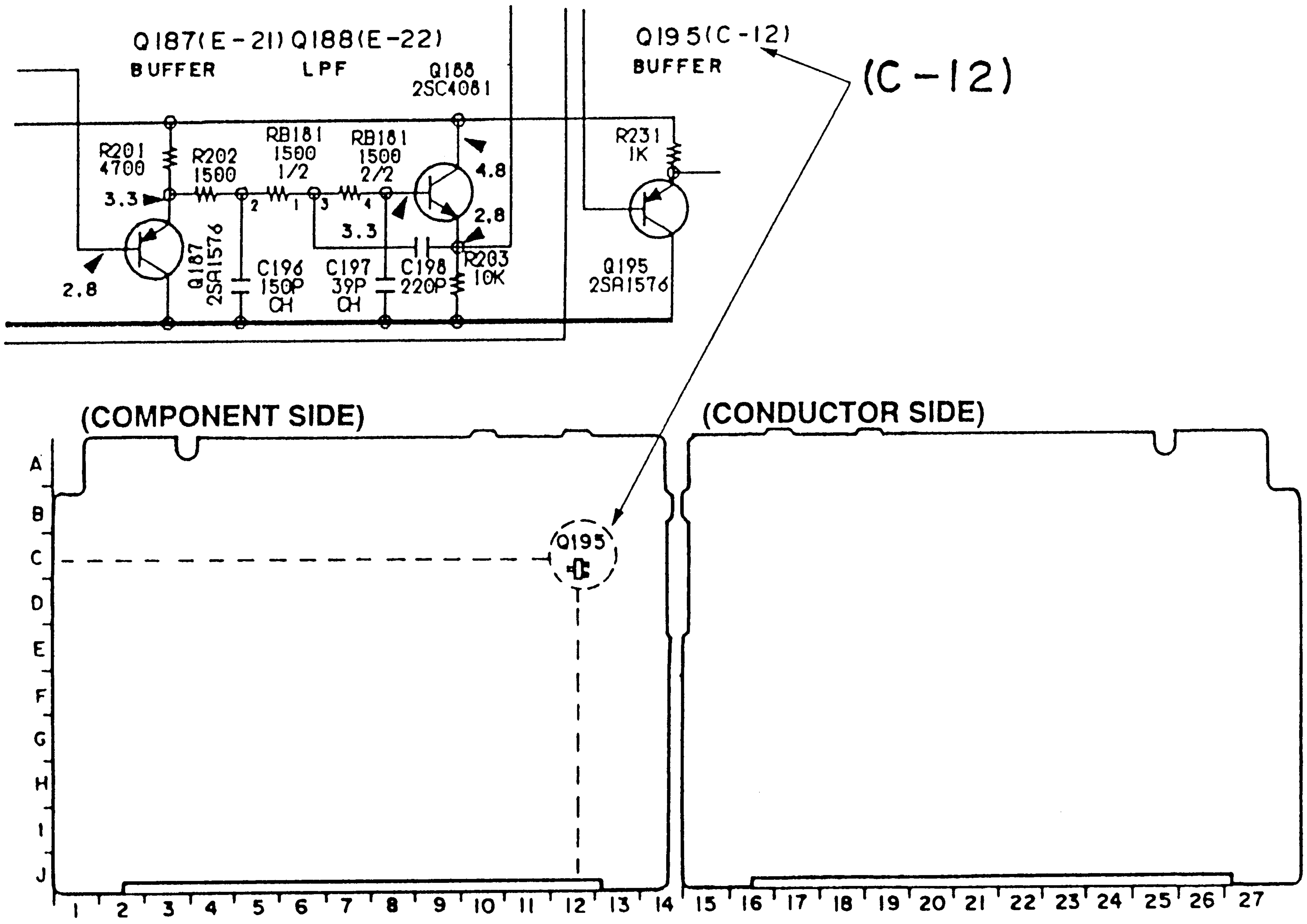
SERVICE NOTE

[ATTACH ADDRESS DISPLAY LOCATION OF ACTUAL SIZE]

In this manual, the mounted locations of all electrical parts in boards are mentioned in blank space of the printed wiring boards. The location display of actual size is attached under the color reproduction frame at the end of this service manual. It will be available if you take a copy of this to a clear sheet.

[SEMICONDUCTOR LOCATION]

In this service manual, the mounted locations of the semiconductors (IC, transistor, diodes) are indicated in red in schematic diagrams. This enables to find the location on the board easily when servicing.



Q187(E-21) Q188(E-22)
BUFFER
LPF
Q188 2SC4081
Q195(C-12)
BUFFER
(C-12)
R201 4700
R202 1500
RB181 1500 1/2
RB181 1500 2/2
4.8
2.8
3.3
3.3
2.8
Q187 2SA1576
C196 150P CH
C197 39P CH
C198 220P
R203 10K
R231 1K
Q195 2SA1576
(COMPONENT SIDE)
(CONDUCTOR SIDE)
Q195
A
B
C
D
E
F
G
H
I
J
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

[HEAD CLEANING]

After an extended period of use the video image may become indistinet or may not appear at all during playback of a tape. The cause of this usually are dirty video heads. For remedy, cleaning of the heads is required.

Check for Head Clogs During Recording

① Use a blank tape, record a short section, then press the stop button to stop.
② Set to recording mode again.
③ If the [⊗] mark is flashing in the viewfinder at this time, head clogs are occurred.

Check During Playback of a Tape

① Play back a pre-recorded tape and display the image on a TV screen.
② If there is no sound and the image is unstable, no image appears on the screen, or tape transport is unstable, head clogs are occurred.

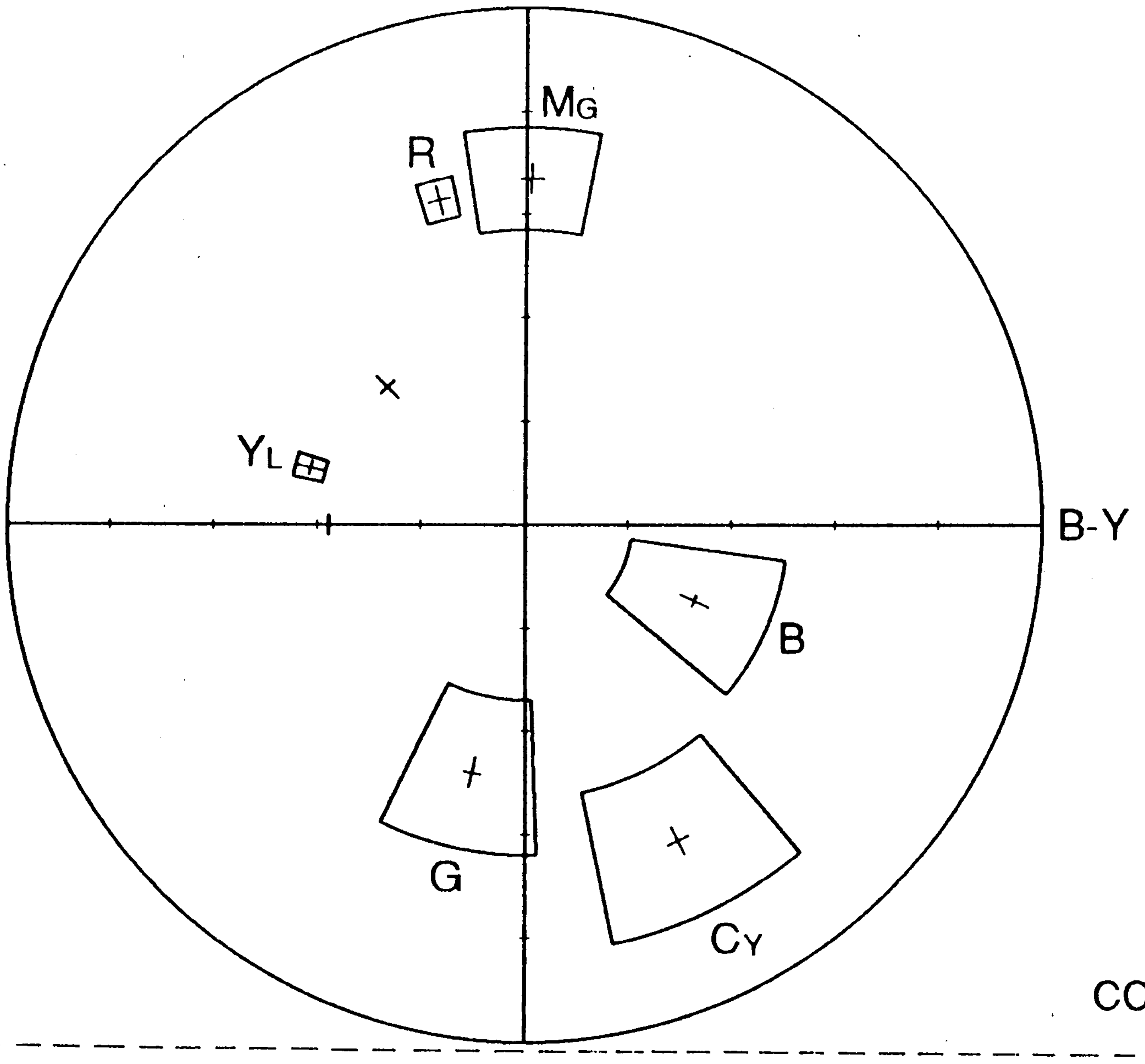
Remedy

[Cleaning method using a cleaning tape]

- Use the Cleaning Tape. (Please follow the instructions attached to the cleaning tape.)

FOR CAMERA COLOR REPRODUCTION ADJUSTMENT

Take a copy of CAMERA COLOR REPRODUCTION FRAME and Parts reference sheets with a clear sheet for use.

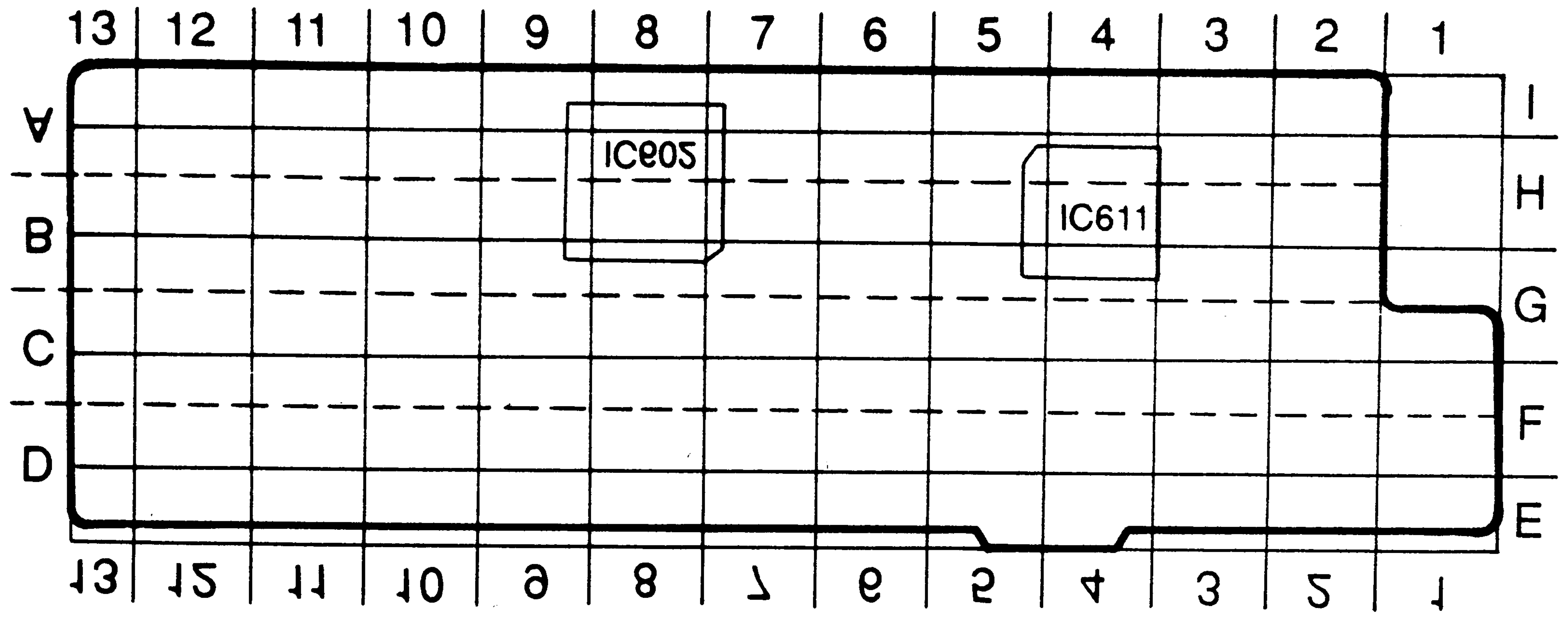

R-Y
MG
R
YL
B-Y
B
G
CY

CCD-FX240/FX340

<PARTS REFERENCE SHEET>

You can find the parts position of mount locations applying to boards of a set.

VC-159 BOARD (CONDUCTOR SIDE)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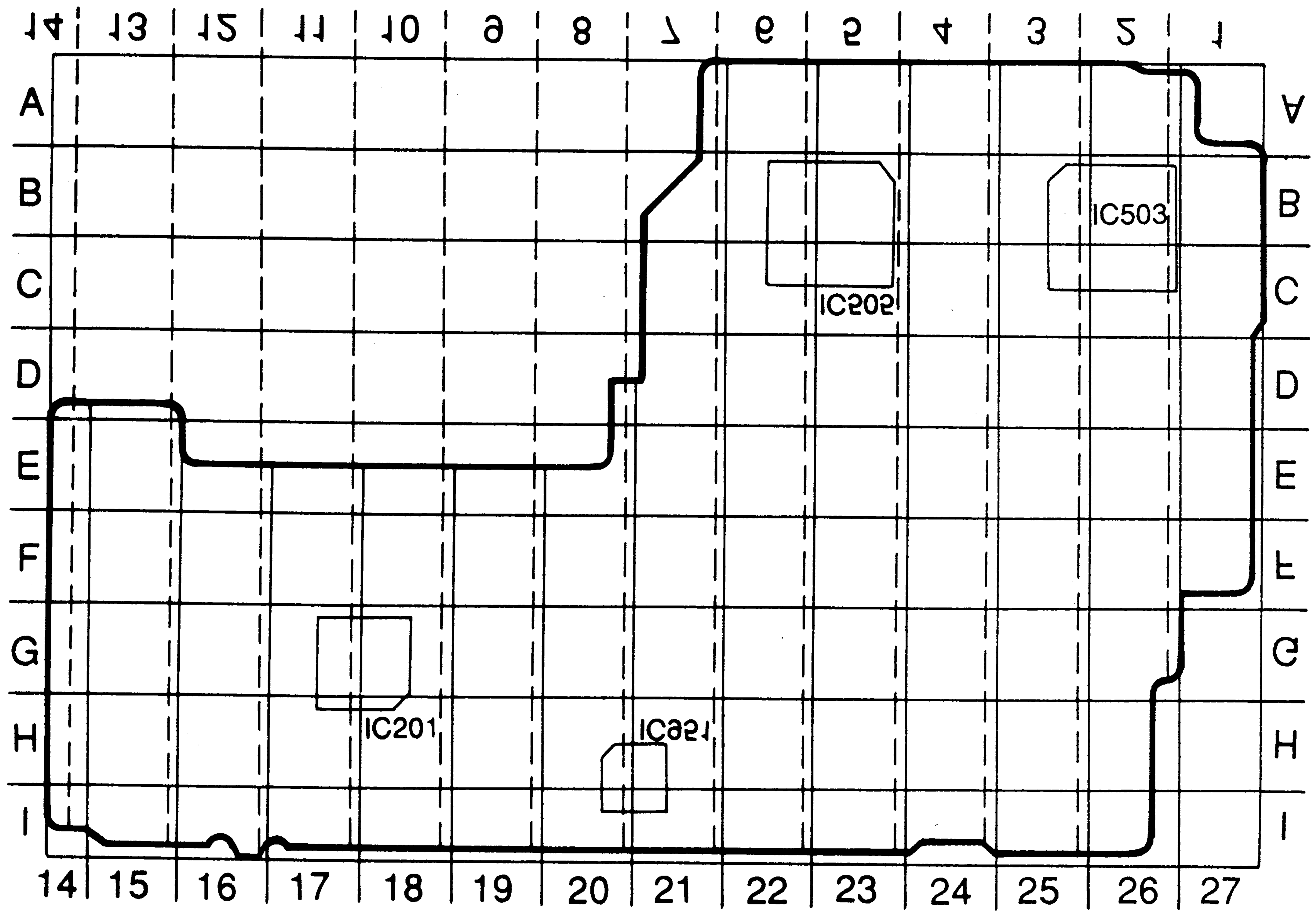
E
IC602
IC611

VC-159 BOARD (COMPONENT SIDE)

CCD-FX240/FX340

VS-123 BOARD (COMPONENT SIDE)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A
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C
D
E
F
G
H
I
IC505
IC503
IC201
IC951
15
16
17
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27

VS-123 BOARD (CONDUCTOR SIDE)

CCD-FX240/FX340

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Sony Corporation
Consumer A&V Products Company
Personal A&V Products Div.

9-973-685-11

SECTION 1
GENERAL

This section is extracted from instruction manual.

Checking Your Model Number

The instructions in this manual are for the two models listed below. Before you start reading this manual and operating the unit, check your model number by looking at the bottom of your camcorder. The CCD-FX240 is the model used for illustration purposes. Otherwise, the model name is indicated in the illustrations. Any differences in operation are clearly indicated in the text, for example, "CCD-FX340 only." As you read through this manual, buttons and settings on the camcorder are shown in capital letters. e.g. "Set the POWER switch to CAMERA."

Types of differences

Model number	Viewfinder	
	Monochrome	Color
CCD-FX240	●	
CCD-FX340		●

Note on TV Color Systems

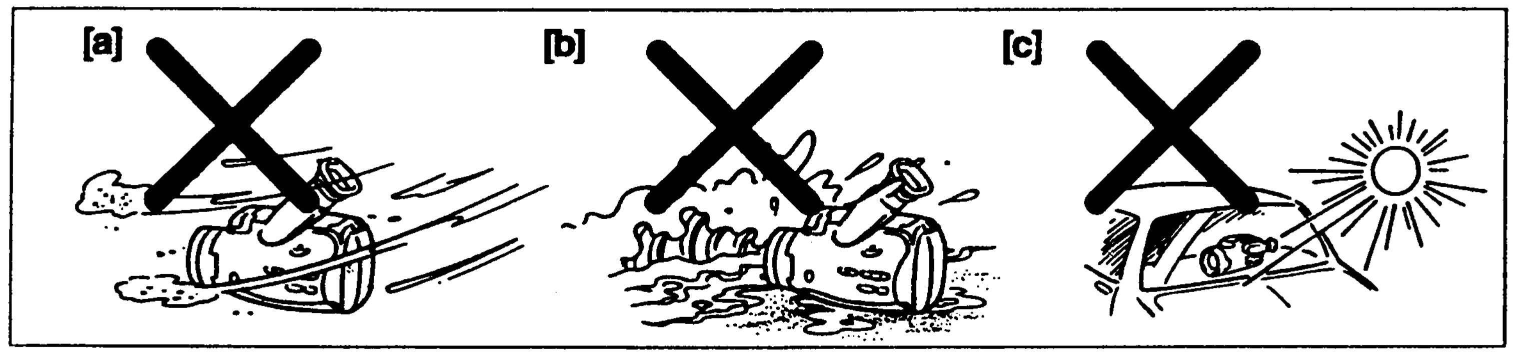
TV color systems differ from country to country. To view your recordings on a TV, you need an NTSC system-based TV. When you want to use a PAL-M system-based TV, you will need an NTSC/PAL-M transcoder (as this is an NTSC system based camcorder). Please check the list on page 39 to find out the TV color system used in your country.

Precaution on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

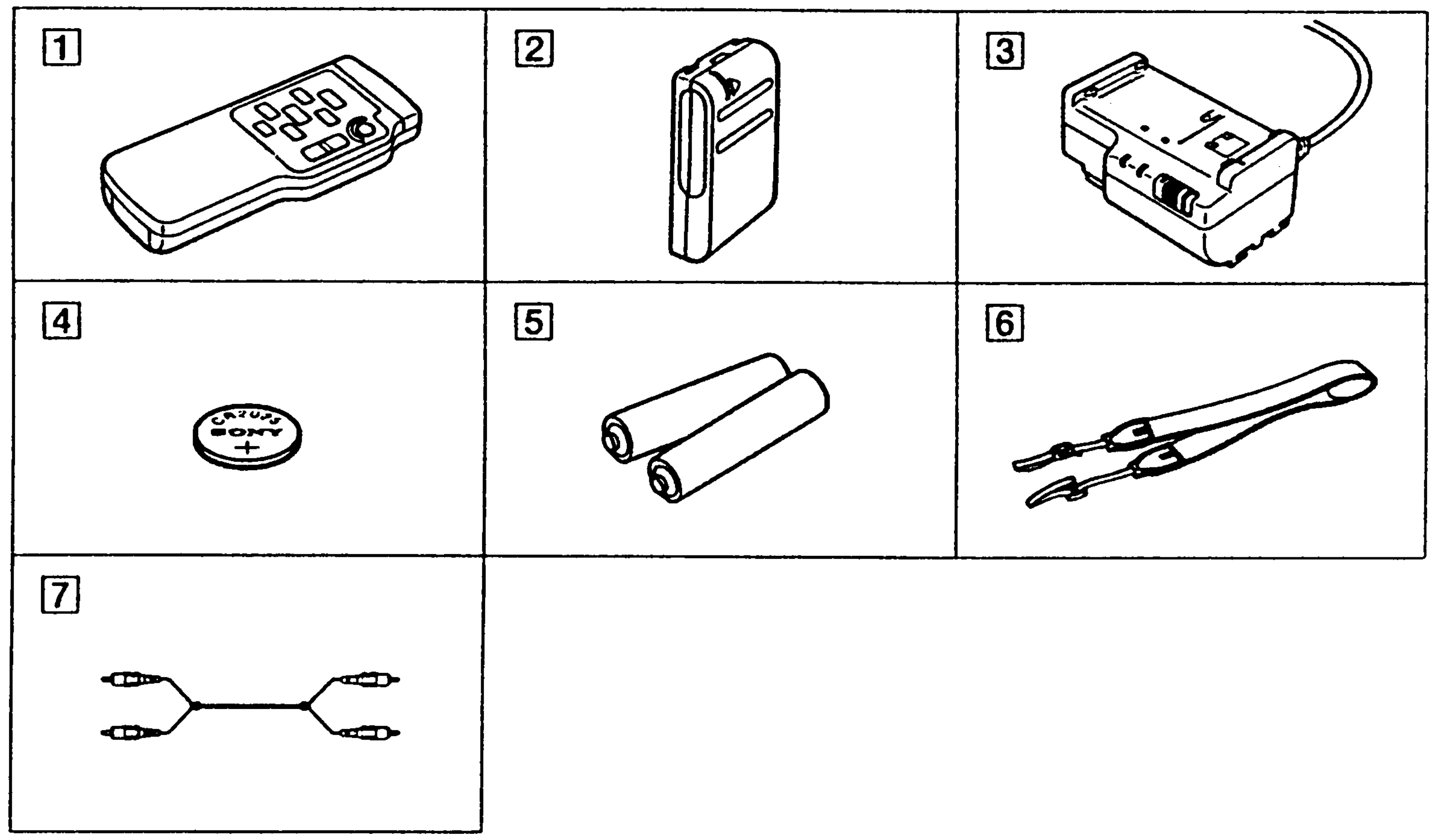
Precautions on Camcorder Care

- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired [a].**
- **Do not let the camcorder get wet. Keep the camcorder away from rain and sea water. Letting the camcorder get wet may cause the unit to malfunction and sometimes the malfunction cannot be repaired [b].**
- **Never leave the camcorder exposed to temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight [c].**



Checking Supplied Accessories

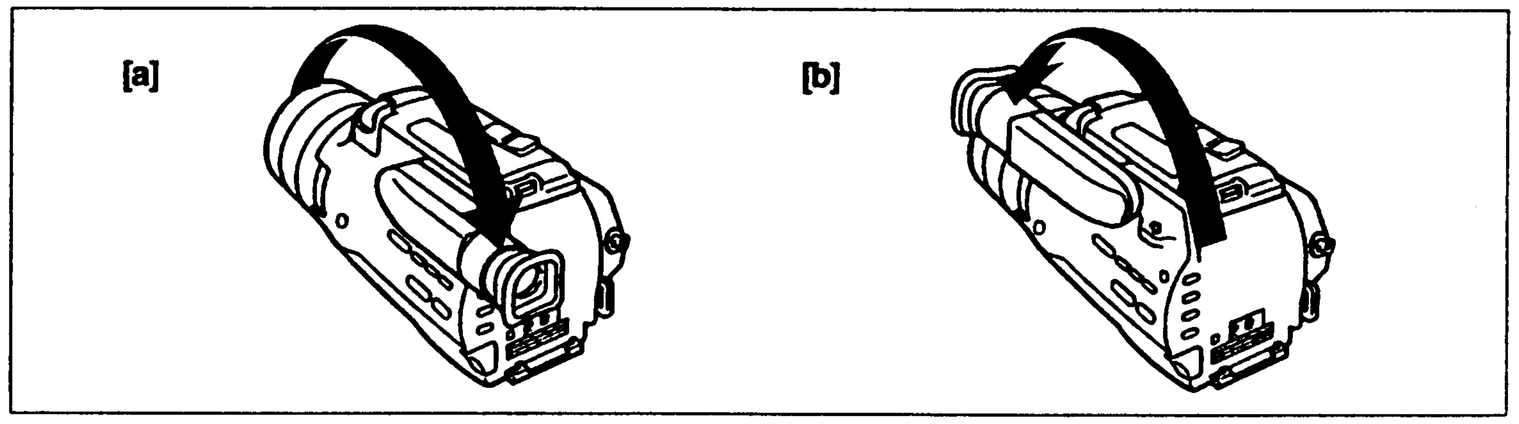
Check that the following accessories are supplied with your camcorder.



1. **Wireless Remote Commander** (1) (p. 49)
2. **NP-55 Battery pack** (1) (p. 6)
3. **AC-V25A/V25B/V25C AC power adaptor** (1) (p. 6, 19)
4. **CR2025 Lithium Battery** (1) (p. 30)
   (The lithium battery is already installed in your camcorder.)
5. **Size AA (R6) battery for Remote Commander** (2) (p. 49)
6. **Shoulder strap** (1) (p. 47)
7. **A/V connecting cable** (1) (p. 16)

After Taking the Camcorder out of the Box

Turn the viewfinder barrel in the direction of the arrow **[a]**. When storing your camcorder, turn the viewfinder barrel in the direction of the arrow **[b]**.



Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V25A/V25B/V25C AC power adaptor.

Charging the Battery Pack

Charge the battery pack on a flat surface without vibration.

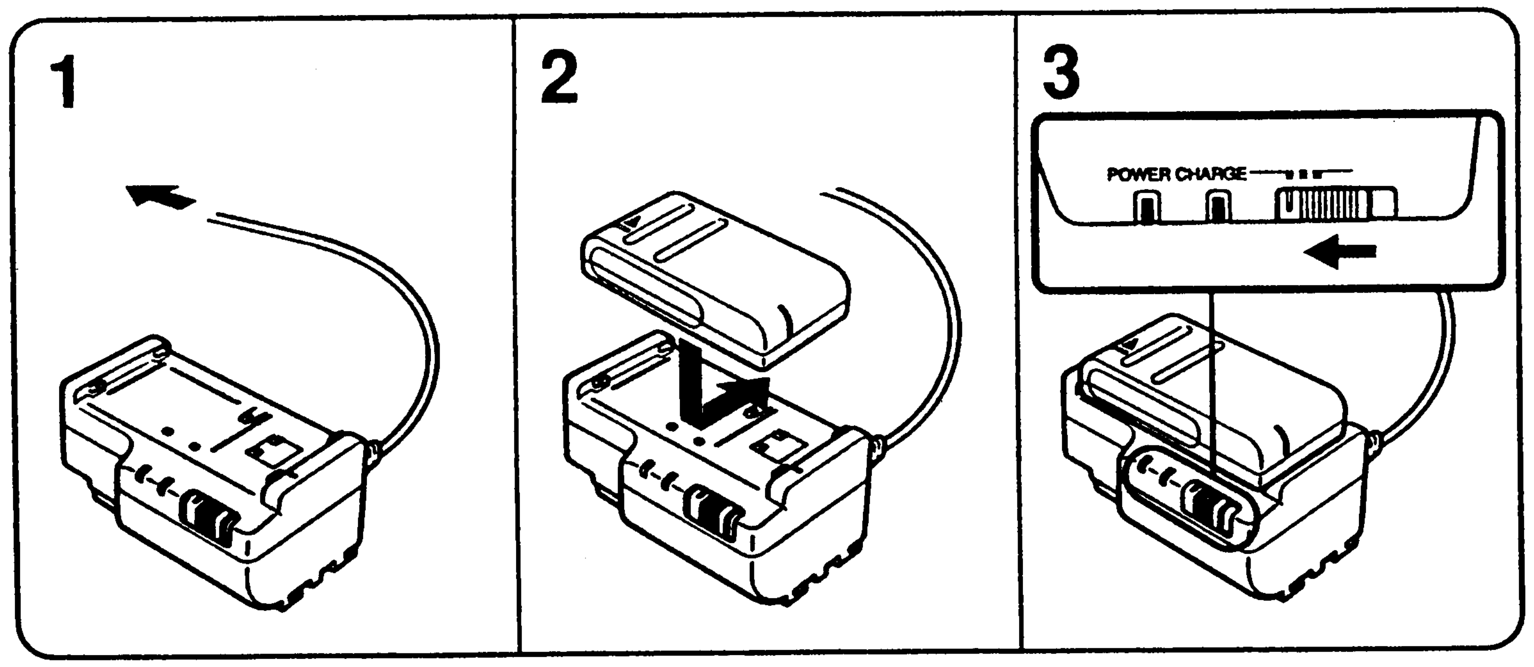
(1) Connect the power cord to a wall outlet.

(2) Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow.

(3) Set the selector to CHARGE. The CHARGE lamp (orange) lights up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Set the selector to the center position and unplug the unit from the wall outlet. Then remove the battery pack and install it on the camcorder.

To stop charging, set the selector to the center position.



Charging Time

Battery pack	NP-55 (supplied)	NP-80 NP-80D	NP-77H	NP-68	NP-C65	NP-60D
Charging time*	70	190	170	125	105	90

* Approximate minutes to charge an empty battery pack using the AC-V25A/V25B/V25C (Lower temperatures require a longer charging time.)

Battery Life

CCD-FX240

Battery pack	NP-55 (supplied)	NP-80 NP-80D	NP-77H	NP-68	NP-C65	NP-60D
Typical recording time**	30	90	85	60	50	45
Continuous recording time***	65	170	165	120	90	80

CCD-FX340

Battery pack	NP-55 (supplied)	NP-80 NP-80D	NP-77H	NP-68	NP-C65	NP-60D
Typical recording time**	30	85	80	60	45	40
Continuous recording time***	60	165	155	115	90	80

** Approximate minutes when recording while you repeat recording start/stop or zooming and turning the power on/off. The actual battery life may be shorter.

*** Approximate continuous recording time indoors.

Important!

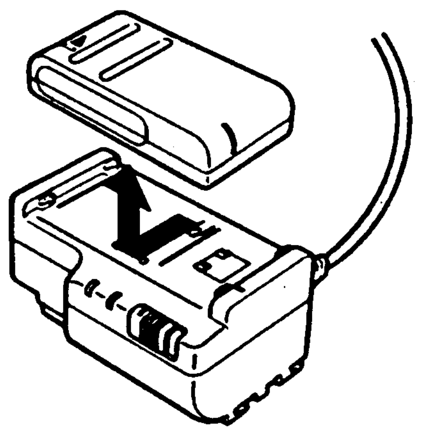
Use the battery completely before re-charging!

Before you recharge the battery pack, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and slide the POWER switch to CAMERA with the battery pack attached, and leave the camcorder until the ⌧ indicator flashes and the red lamp flashes rapidly in the viewfinder.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow (see drawing).



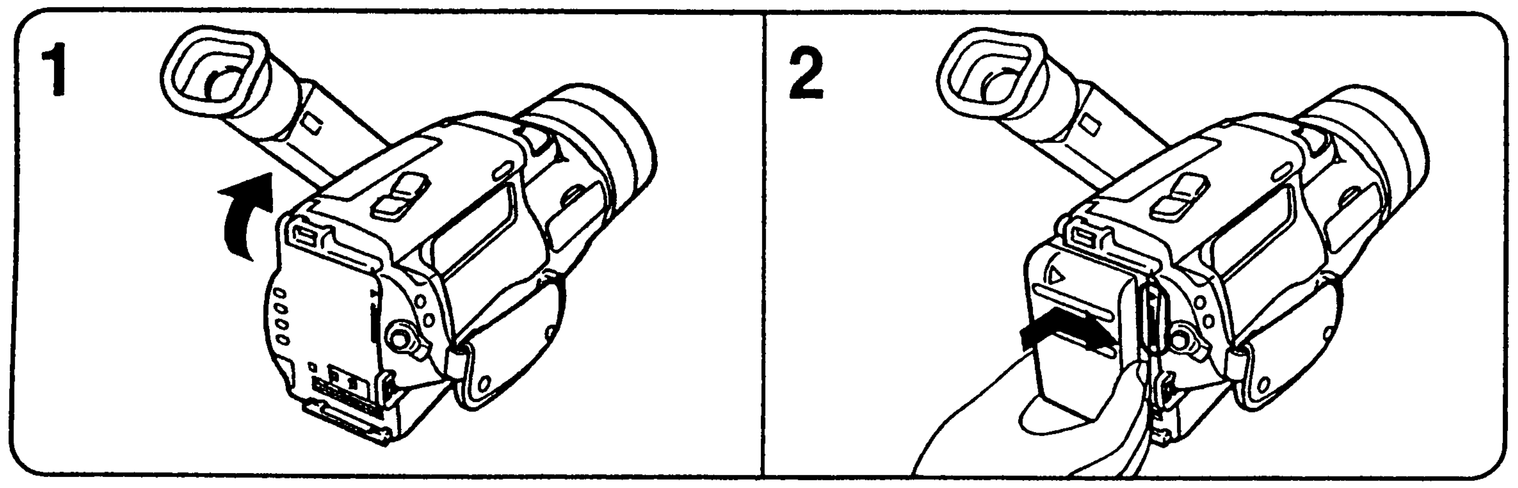
Note on charging the battery pack

- The POWER lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

Charging and Installing the Battery Pack

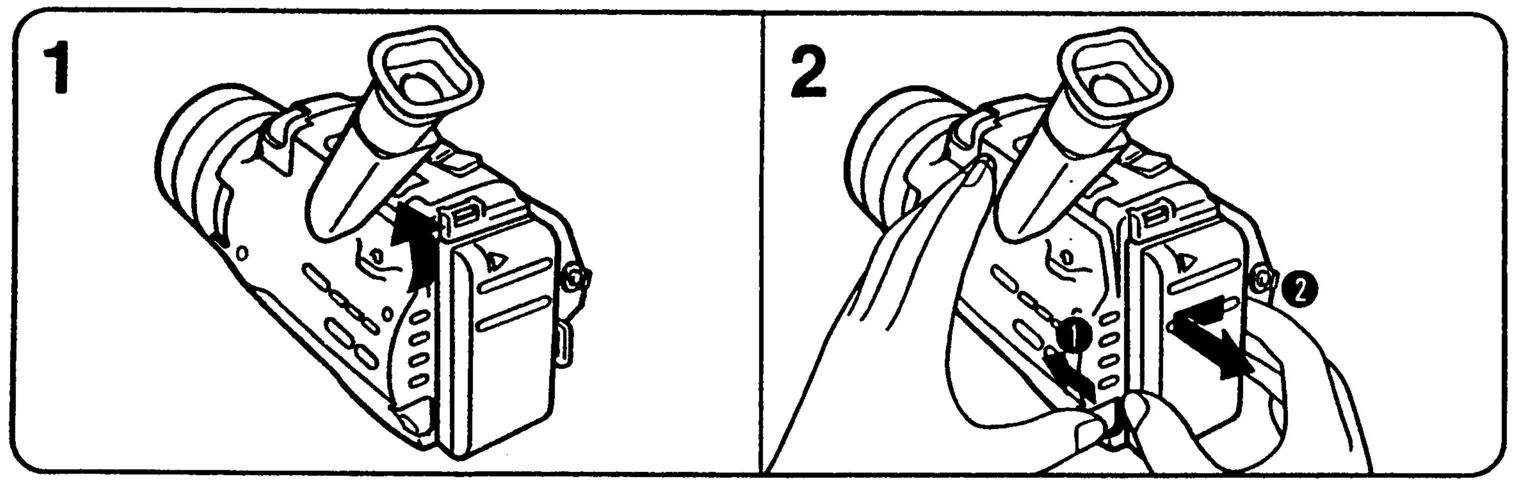
Installing the Battery Pack

(1) Lift up the viewfinder.
(2) Align the right side of the battery pack with the white line on the camcorder, and slide the battery pack to the right.



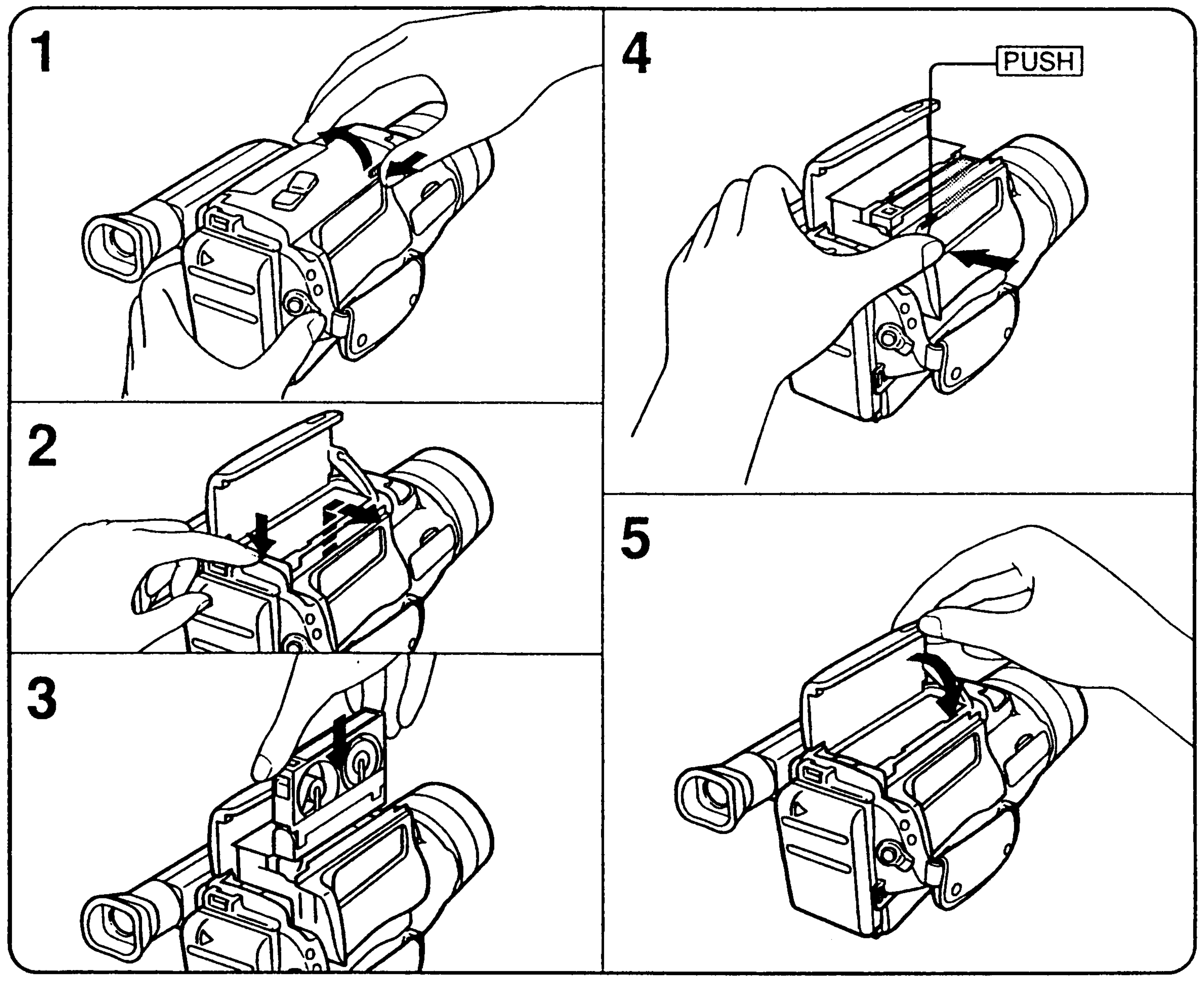
Removing the Battery Pack

(1) Lift up the viewfinder.
(2) While pressing BATT, slide the battery pack to the left.



Inserting a Cassette

Make sure that the power source is installed.
(1) While sliding the lid lock in the direction of the arrow, lift up the lid.
(2) Press EJECT. The cassette compartment automatically lifts up and opens.
(3) Insert a cassette with the window facing out.
(4) Close the cassette compartment by pressing the "PUSH" mark on the cassette compartment.
(5) Close the lid.

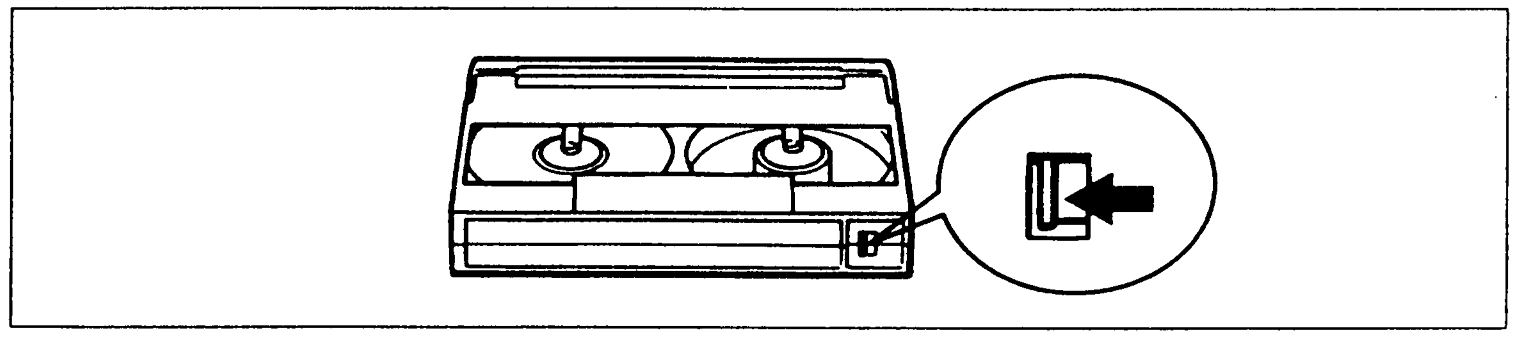


To Eject the Cassette

While sliding the lid lock in the direction of the arrow, lift up the lid of the cassette holder and press EJECT.

Preventing Accidental Erasure

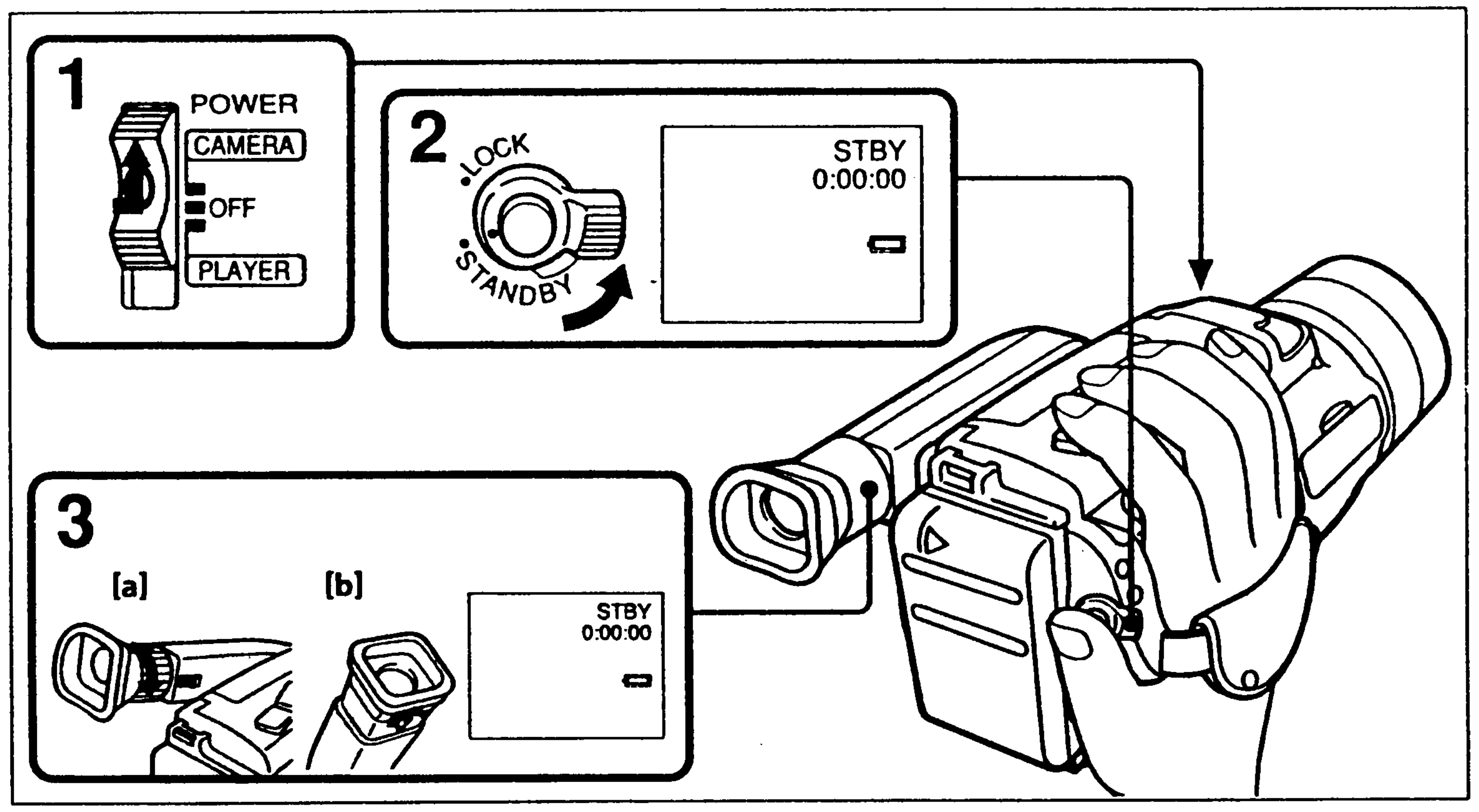
To prevent accidental erasure, slide the tab on the cassette to expose the red mark. If you try to record with the red mark exposed, the ▣ and ▲ indicators flash in the viewfinder, and you cannot record.
To re-record on this tape, slide the tab back out covering the red mark.



Adjusting the Viewfinder Lens

Before you use the camcorder for the first time or after someone else has used it, focus the viewfinder lens. Make sure that the power source is attached to the camcorder.

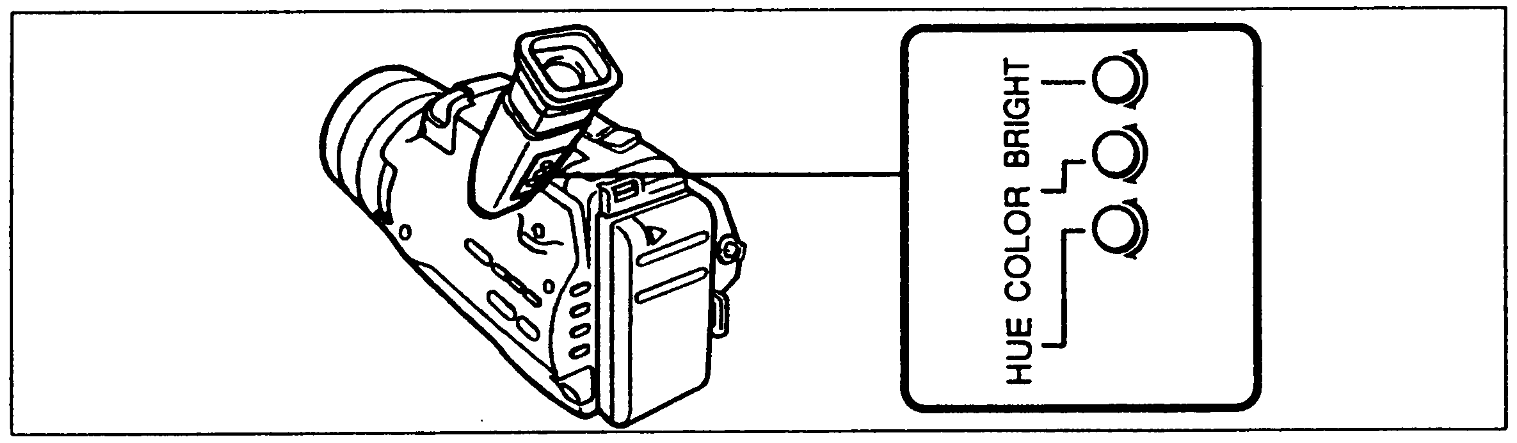
(1) While pressing the small green button on the POWER switch, slide it to CAMERA. The lens cover opens.
(2) Turn STANDBY up.
(3) Focus on the indicators: **[a]** When using a monochrome viewfinder, turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus. **[b]** When using a color viewfinder, move the viewfinder lens adjustment lever so that the indicators in the viewfinder come into sharp focus.


1
POWER
CAMERA
OFF
PLAYER
2
LOCK
STANDBY
STBY
0:00:00
3
[a]
[b]
STBY
0:00:00

When Using a Color Viewfinder — For CCD-FX340 only

To adjust the picture quality

If you want to change hue, color and brightness of the picture displayed on the viewfinder screen, turn the screws on the viewfinder slowly using a screwdriver (not supplied). You do not need to adjust them in everyday operation.


HUE
COLOR
BRIGHT

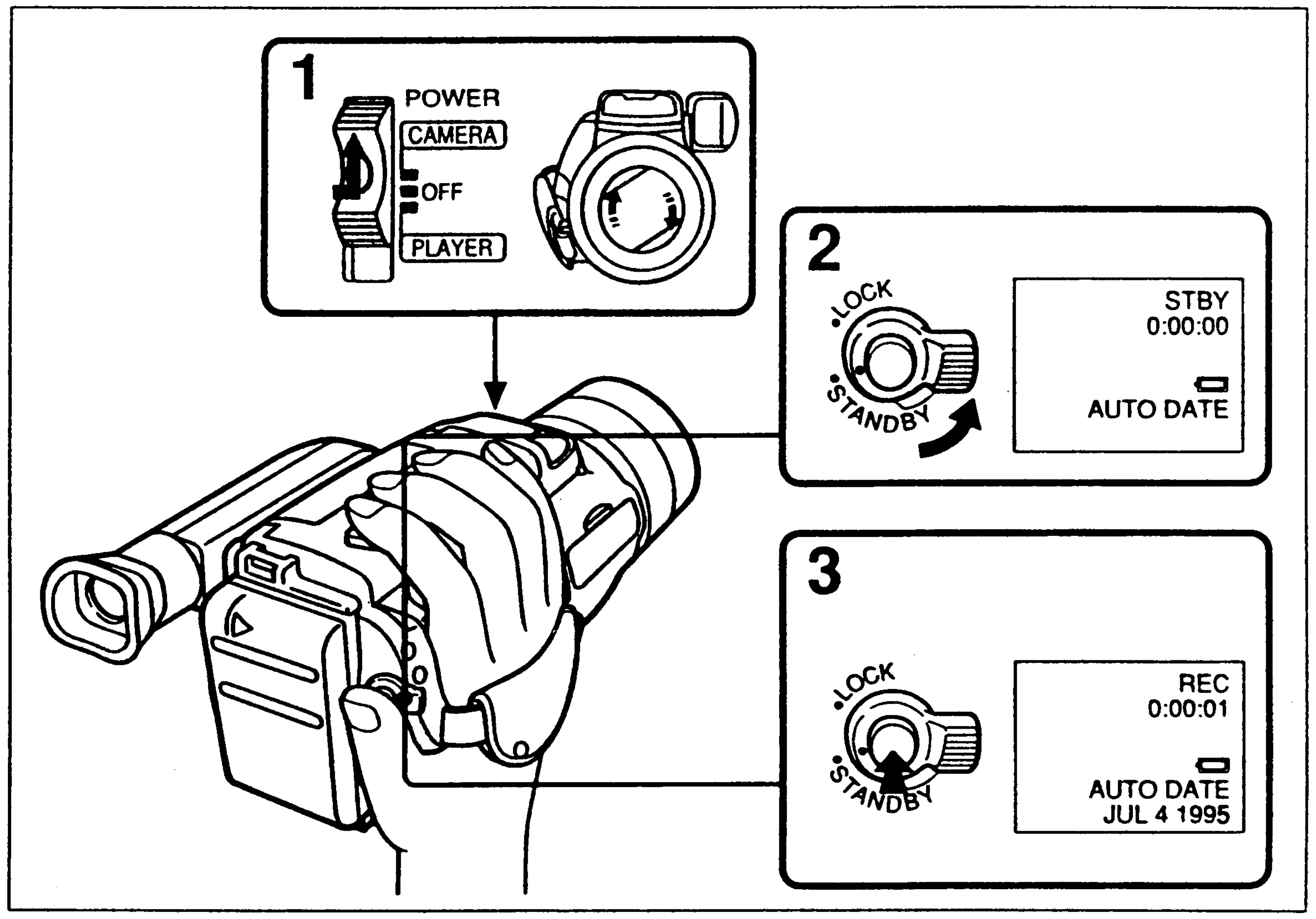
	Turn clockwise	Turn counterclockwise
BRIGHT	More brightness	Less brightness
COLOR	More color intensity	Less color intensity
HUE	Greenish skin tones	Reddish skin tones

Basic Operations

Camera Recording

Make sure that the power source is installed and a cassette is inserted. The date is automatically recorded for 10 seconds after you start recording (AUTO DATE feature). This feature works only once a day.
Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working correctly.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA.
(2) Turn STANDBY up.
(3) Press START/STOP. The camcorder starts recording. The "REC" indicator appears and the red lamp lights up in the viewfinder. The camera recording/battery lamp on the viewfinder barrel also lights up.

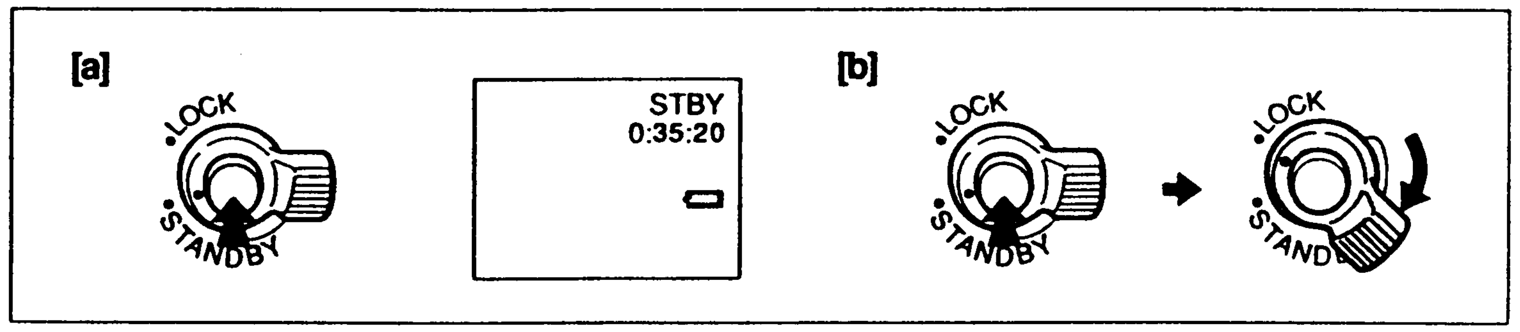

1
POWER
CAMERA
OFF
PLAYER
2
LOCK
STANDBY
STBY
0:00:00
AUTO DATE
3
LOCK
STANDBY
REC
0:00:01
AUTO DATE
JUL 4 1995

To Stop Recording Momentarily [a]

Press START/STOP again. The "STBY" indicator appears in the viewfinder (**Standby mode**).

To Finish Recording [b]

Press START/STOP again. Turn STANDBY down and slide the POWER switch to OFF. The lens cover closes. Then, eject the cassette (p. 9).


[a]
LOCK
STANDBY
STBY
0:35:20
[b]
LOCK
STANDBY
LOCK
STAND

(See next page for further information)

Camera Recording

Note on Standby mode

If you leave the camcorder in Standby mode for 5 minutes while the cassette is inserted, the camcorder turns off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on recording

When you record from the beginning of a tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape.

You can record tapes in SP (standard play) mode only.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET.

Note on the AUTO DATE feature

The clock is set to the East Coast Standard Time at the factory, but you can reset the clock in the menu system (p. 31). You can change the AUTO DATE settings by selecting ON or OFF in the menu system.

The AUTO DATE feature works once a day. However, the date may automatically appear more than once a day when:

- you reset the date and time.
- you eject and insert the tape again.
- you stop recording within 10 seconds.
- you set AUTO DATE to OFF once and set to ON again in the menu system.

When moving from indoors to outdoors (or vice versa)

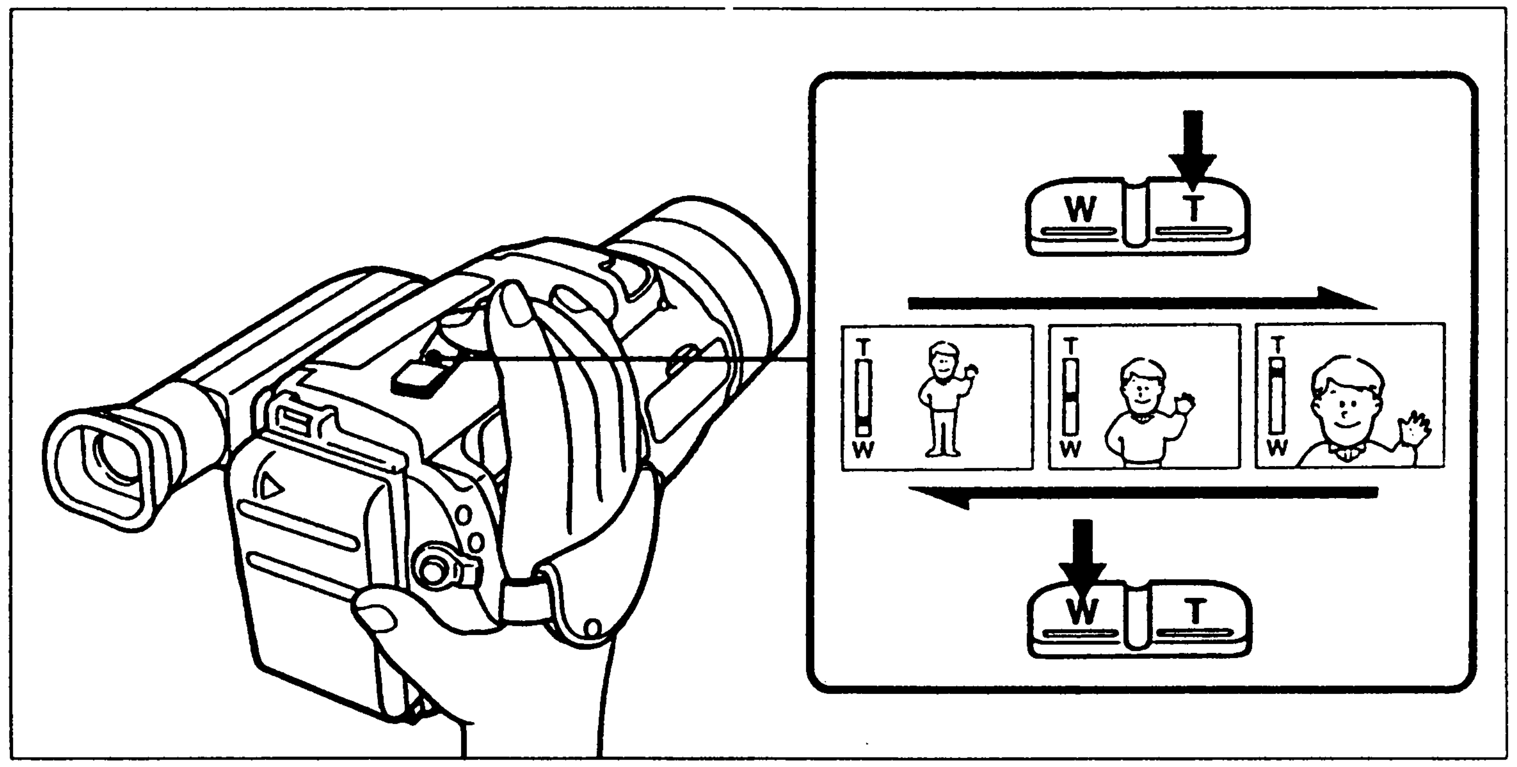
Turn STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene.
For more professional-looking recordings, use the zoom function sparingly.

"T" side: for telephoto (subject appears closer)

"W" side: for wide-angle (subject appears farther away)



Zooming Speed (Dual speed zooming)

Press the power zoom button firmly for a high-speed zoom, press it softly for a relatively slow zoom.

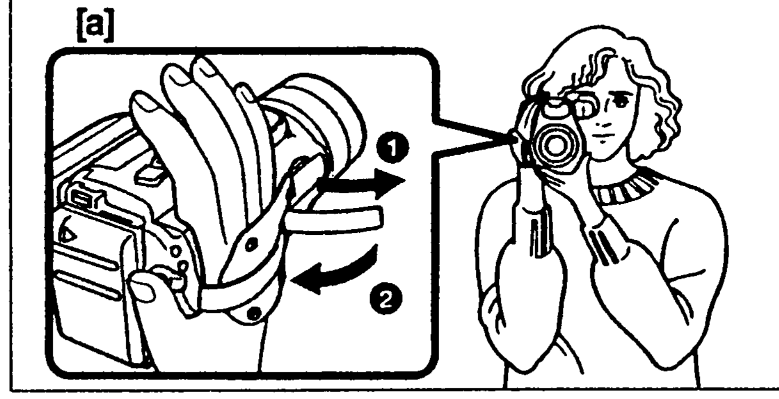
When you shoot a subject using a telephoto zoom

If you cannot get a sharp focus while in extreme telephoto zoom, press the "W" side of the power zoom button until the focus is sharp. You can shoot a subject that is at least about 3 1/4 feet (100 cm) away from the lens surface in the telephoto position, or about 1/2 inches (1 cm) in the wide-angle position.

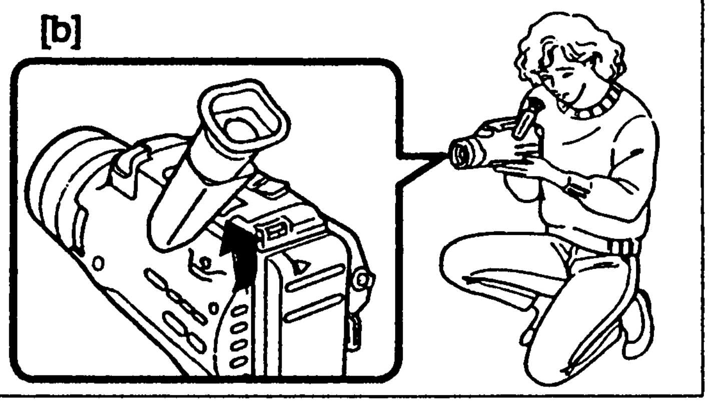
Hints for Better Shooting

For hand-held shots, you'll get better results by holding the camcorder according to the following suggestions:

[a]



[b]



- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb **[a]**.
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Lift the viewfinder up for recording from a low position. (You can turn it to 180 degrees.) **[b]**

Place the camcorder on a flat surface or use a tripod

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 46). When attaching a non-Sony tripod, make sure that the length of the tripod screw is less than 9/32 in (6.5 mm). Otherwise, the screw may damage the inner parts of the camcorder.

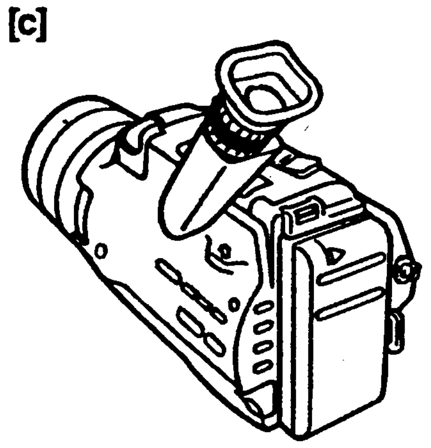
Using the Viewfinder as a Sports Finder — CCD-FX240 only

With the Sports Finder, you can monitor the picture while your eyes are at a distance from the eyecup. You can shoot scenes while moving around.
When using the viewfinder as a Sports Finder, turn the viewfinder lens adjustment ring clockwise until it stops **[c]**.
When returning to the normal viewfinder position, turn the viewfinder lens adjustment ring counterclockwise until the indicators in the viewfinder come into sharp focus.

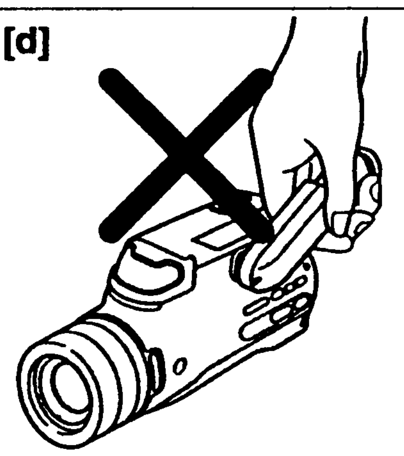
Cautions on the viewfinder

- Do not pick up the camcorder by the viewfinder **[d]**.
- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be deformed. Be careful when placing the camcorder under sunlight or by the window **[e]**.

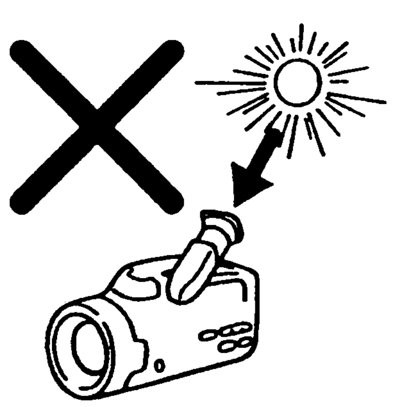
[c]



[d]

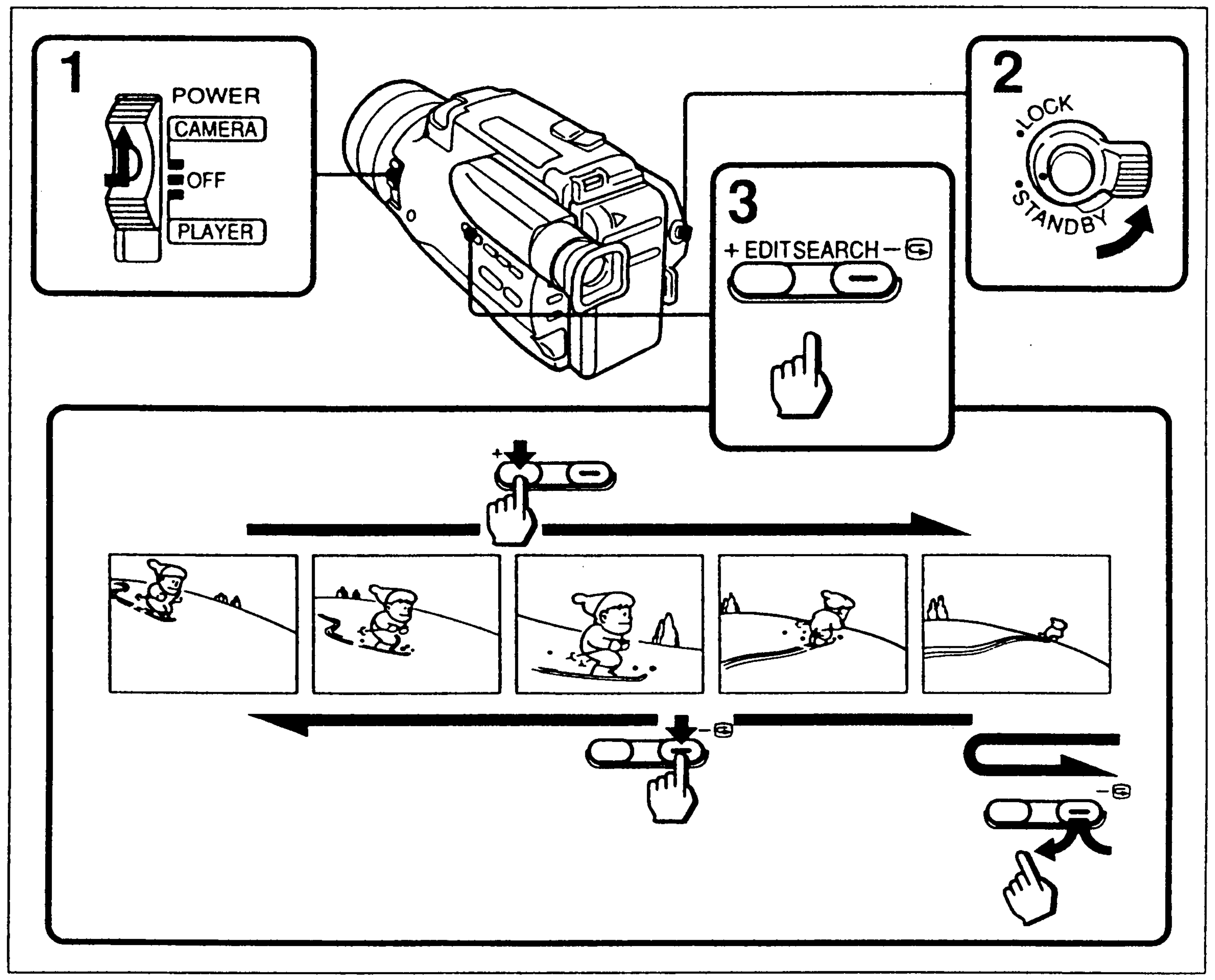


[e]



Checking the Recorded Picture

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.
(1) While pressing the small green button on the POWER switch, slide it to CAMERA.
(2) Turn STANDBY up.
(3) Press the – (⊜) side of EDITSEARCH momentarily; the last few seconds of the recorded portion plays back (**Rec Review**).
You can also monitor the sound by using an earphone (not supplied).
Hold down the – side of EDITSEARCH until the camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the + side (**Edit Search**).



To Begin Re-recording

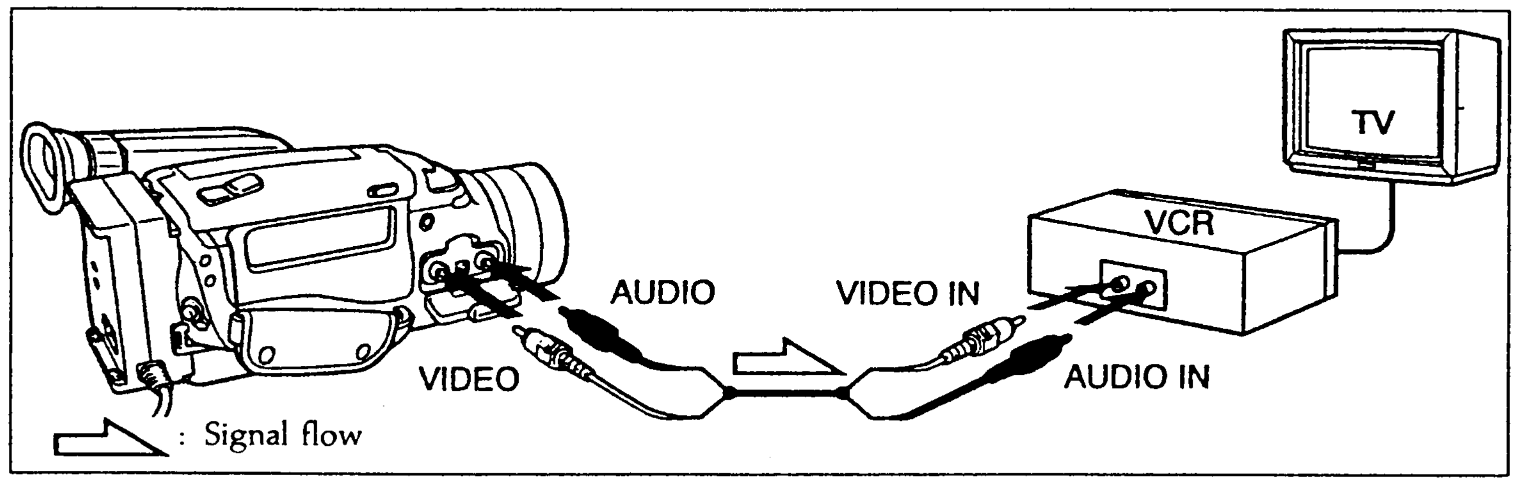
Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the tape, the transition between the last scene you recorded and the next scene you record will be smooth.

Connections for Playback

You can use the camcorder as a VCR. Connect the camcorder to the TV by using the supplied A/V connecting cable. There are two ways to connect the camcorder to your TV. When monitoring the playback picture by connecting the camcorder to your TV, we recommend you use house current for the power source (p. 19).

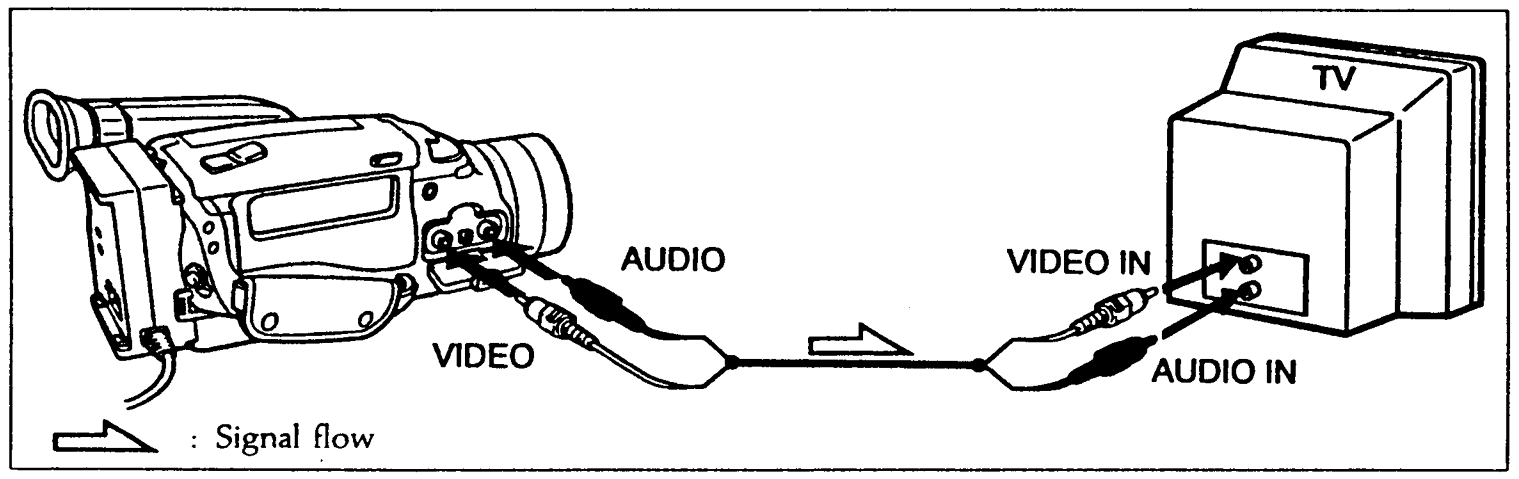
If your VCR is already connected to a TV

Connect the camcorder to the LINE IN inputs on the VCR by using the supplied A/V connecting cable. Set the input selector on the VCR to LINE. Set the TV/VCR selector on the TV toVCR.


TV
VCR
AUDIO
VIDEO IN
VIDEO
AUDIO IN
: Signal flow

Connecting directly to a TV

Connect the camcorder to the inputs on the TV by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR.


TV
AUDIO
VIDEO IN
VIDEO
AUDIO IN
: Signal flow

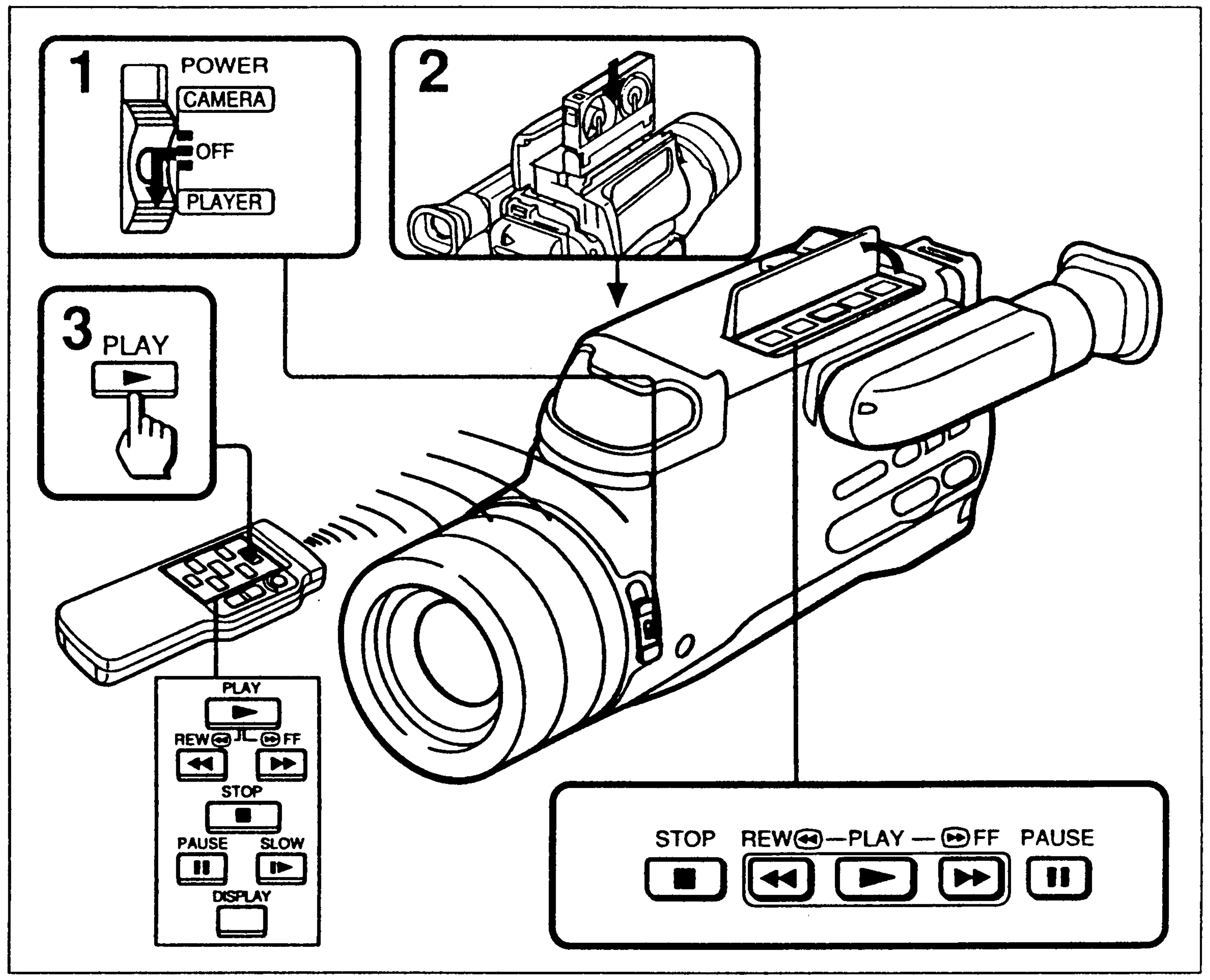
To connect a TV or a VCR without audio/video input jacks

Use the RFU-95UC RFU adaptor (not supplied).

Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor the picture on a TV screen, after connecting the camcorder to a TV or VCR (p. 16). You can use the supplied Remote Commander to control playback.

(1) While pressing the small green button on the POWER switch, slide it to PLAYER.
(2) Insert the recorded tape with the window facing out.
(3) Press ►. Playback starts.


1
POWER
CAMERA
OFF
PLAYER
2
3 PLAY
PLAY
REW JL FF
STOP
PAUSE
SLOW
DISPLAY
STOP
REW—PLAY—FF
PAUSE

To stop playback, press ■.
To rewind the tape, press ◄◄.
To advance the tape rapidly, press ►►.

Various Playback Modes

To view a still picture (Playback pause)
Press ❚❚ during playback. To resume playback, press ❚❚ or ▶.

To locate a scene (Picture search)
Keep pressing ◀◀ or ▶▶ during playback. To resume normal playback, release the button.

To monitor the high-speed picture while advancing the tape or rewinding (Skip scan)
Keep pressing ◀◀ while rewinding or ▶▶ while advancing the tape. To resume normal playback, press ▶.

To view the picture in a sequence of stop-motion images
Press EDITSEARCH in Playback pause mode. If you keep pressing EDITSEARCH, you can view the picture play back in the forward (+) or reverse (–) direction.

To view the picture at 1/5 speed (Slow Playback) (only with the Remote Commander)
Press I▶ on the Remote Commander during playback. To resume normal playback, press ▶. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

Note on playback
- Streaks appear and the sound is muted in the various playback modes.
- When Playback pause mode lasts for 5 minutes, the camcorder automatically enters stop mode.

To display the viewfinder screen indicators on the TV
Press DISPLAY on the Remote Commander. To erase the indicators, press DISPLAY again.

Advanced Operations

Using Alternative Power Sources

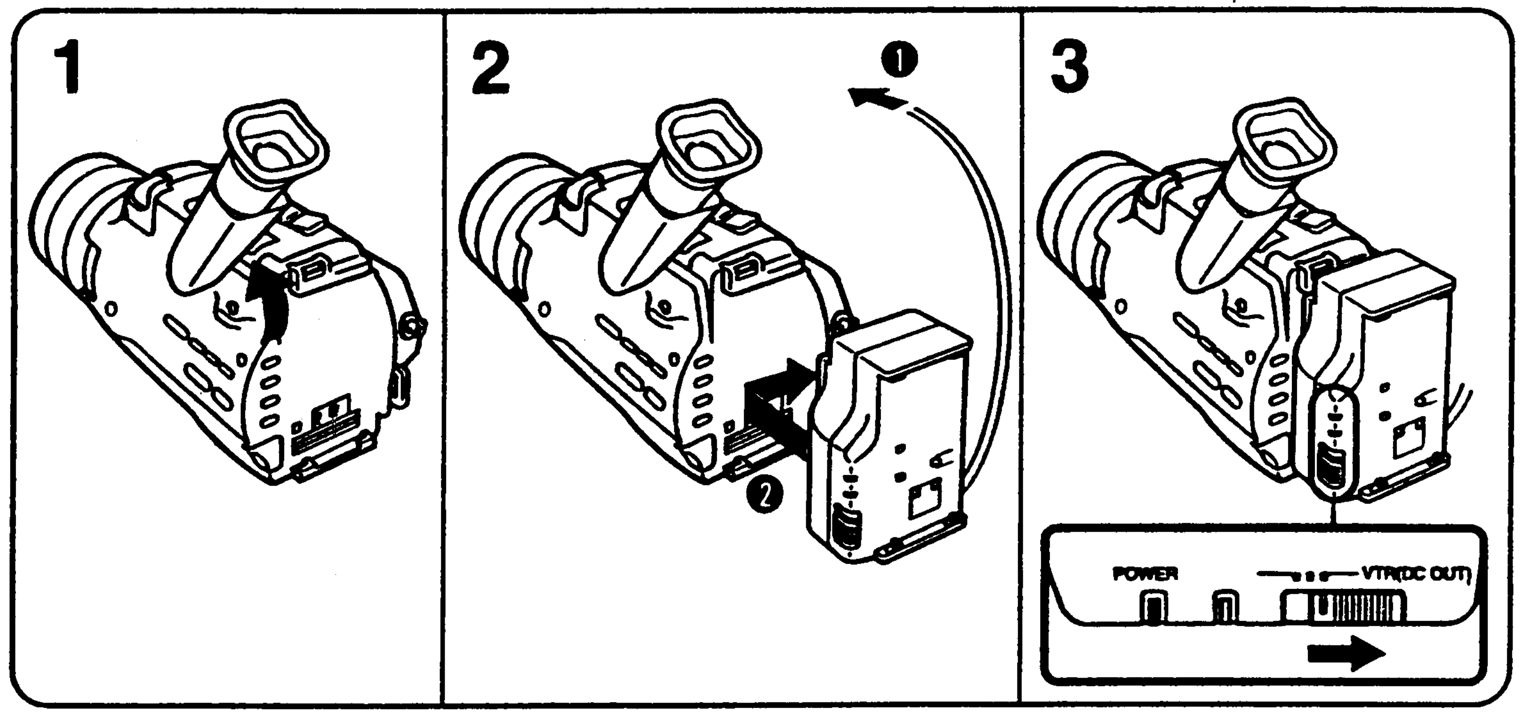
You can choose any of the following power sources for your camcorder: battery pack (p. 6), house current, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC power adaptor AC-V25A/V25B/V25C (supplied), AC-S10, AC-V55
Outdoors	Battery pack	Battery pack NP-55 (supplied), NP-80/80D, NP-77H, NP-68, NP-C65, NP-60D
In the car	12 V or 24 V car battery	DC pack DCP-77

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If this happens, restore the power supply again immediately.

Using House Current

To use the supplied AC-V25A/V25B/V25C AC power adaptor:
(1) Lift up the viewfinder.
(2) Connect the AC power cord to a wall outlet. Connect the bottom of the AC power adaptor to the battery mounting surface of the camcorder.
(3) Set the selector to VTR (DC OUT).



Notes on the POWER lamp
- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to VTR (DC OUT) again.

To remove the adaptor
The adaptor is removed in the same way as the battery pack (p. 8).

Using Alternative Power Sources

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

To remove the DC pack
The DC pack is removed in the same way as the battery pack (p. 8).

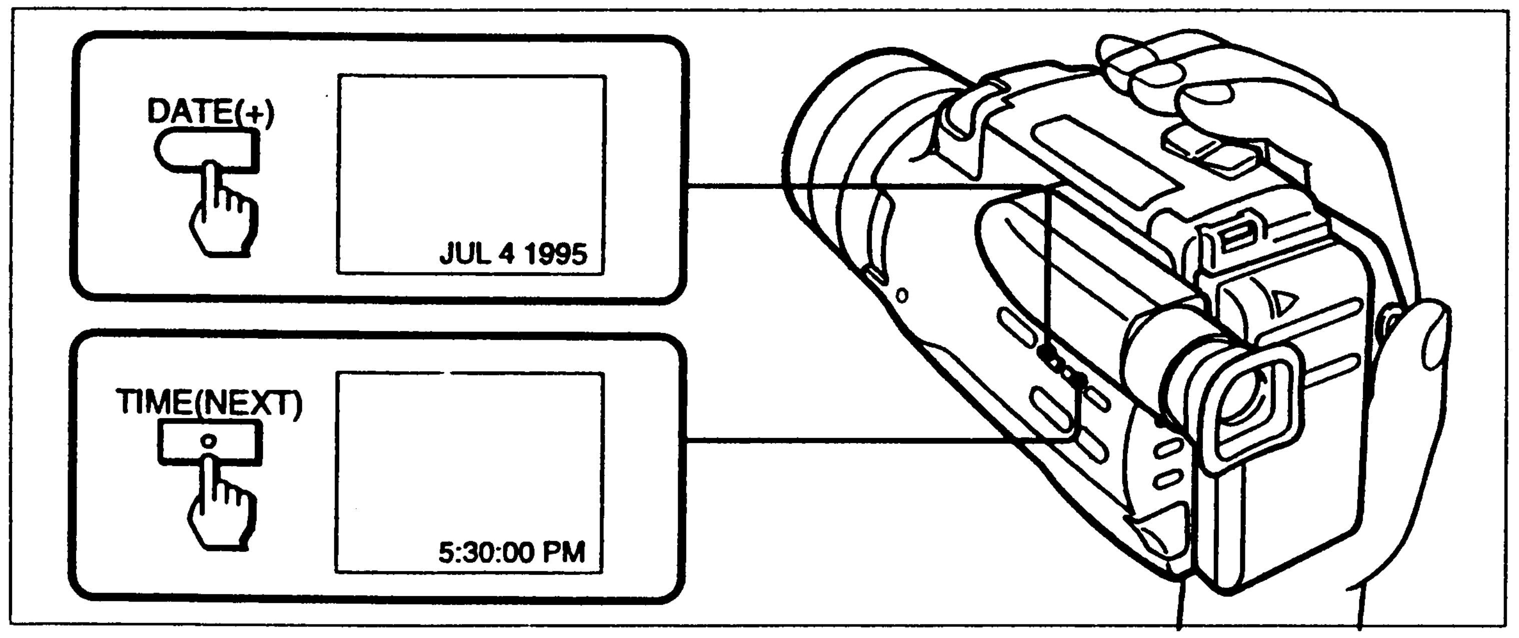
Options for Charging the Battery Pack

- AC-S10 AC power adaptor:
  You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.
- BC-S10 portable battery charger (ideal for travel):
  You can charge a battery pack on 100 — 240 V AC current.

This mark indicates that this product is a genuine product related our 8mm video equipment. When purchasing our 8mm video equipment, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

Recording with the Date or Time

Before you start recording, press DATE (+) or TIME (NEXT). You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date, time or age indicator, no indicator in the viewfinder is recorded.
The clock is set to the East Coast Standard Time at the factory, but you can reset the clock in the menu system (p. 31).


DATE(+)
JUL 4 1995
TIME(NEXT)
5:30:00 PM

To Stop Recording with the Date or Time

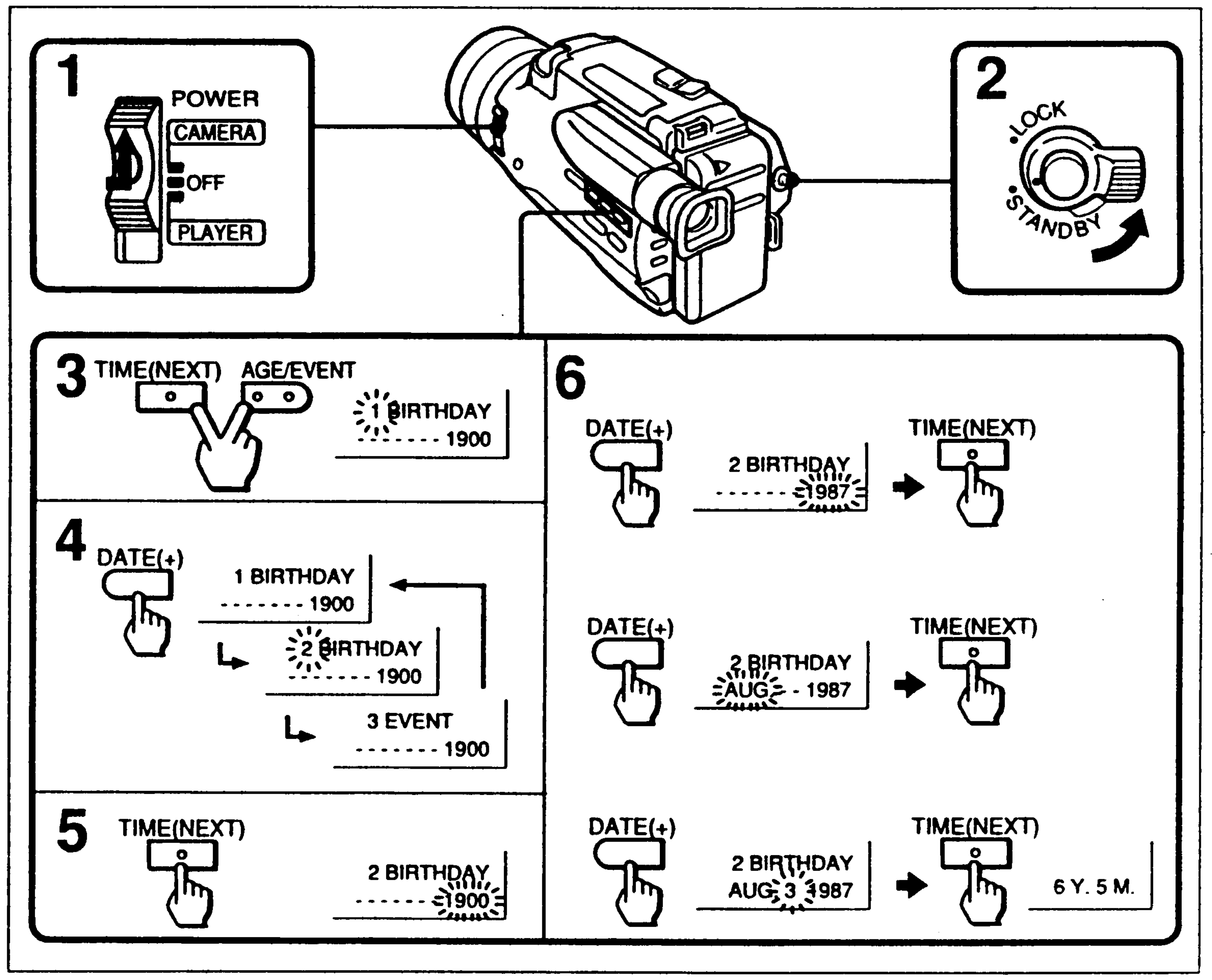
Press DATE (+) or TIME (NEXT) again. The date or time indicator disappears. The recording continues.

Recording with the Age

Storing a Birth Date in Your Camcorder

By presetting your child's birth date in your camcorder, you can record your child's age in years and months on your tape. Once you enter the birth date of your child, the camcorder's clock will automatically update the age of your child. You can preset up to three birth dates or events in the camcorder's memory.
Before storing a birth date, make sure a power source and the lithium battery are installed, and the date setting is correct. The following procedure stores "Aug. 3 1987" in memory 2 as an example.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA.
(2) Turn STANDBY up.
(3) Press TIME (NEXT) and AGE/EVENT simultaneously for a few seconds until the "1 BIRTHDAY--- --1900" indicator appears in the viewfinder.
(4) Press DATE (+) to select "2 BIRTHDAY."
(5) Press TIME (NEXT). The "1900" indicator flashes.
(6) Enter the birth date by adjusting the flashing indicators of the year, month and day by pressing DATE (+) and TIME (NEXT). Note that when you keep DATE (+) pressed, the digits advance faster.


1
POWER
CAMERA
OFF
PLAYER
2
LOCK
STANDBY
3
TIME(NEXT)
AGE/EVENT
1 BIRTHDAY
------- 1900
4
DATE(+)
1 BIRTHDAY
------- 1900
2 BIRTHDAY
------- 1900
3 EVENT
------- 1900
5
TIME(NEXT)
2 BIRTHDAY
------- 1900
6
DATE(+)
2 BIRTHDAY
------- 1987
TIME(NEXT)
DATE(+)
2 BIRTHDAY
AUG - 1987
TIME(NEXT)
DATE(+)
2 BIRTHDAY
AUG 3 1987
TIME(NEXT)
6 Y. 5 M.

Note on the birth or event dates indicators
Each time you press DATE (+), the display in the viewfinder changes from "1 BIRTHDAY" to "2 BIRTHDAY," "3 EVENT" and comes back to "1 BIRTHDAY."

Erasing the Age Indicator in the Viewfinder

Press AGE/EVENT repeatedly until no indicator appears.

If You Missed the Correct Number with DATE (+)

Keep pressing DATE (+). The indicator changes as follows:

Year: "1900" → "1901" ---→ Current year
└-- Current year minus 99 ←┘

Month: "JAN." → "FEB." ---→ "DEC." → "---"

Day: "1" → "2" ---→ "31"

To Correct the Setting

Repeat steps from 3 to 6.

To Preset the Year before 1900

(1) After step 5, keep pressing DATE (+) until the current year is displayed.
(2) Press DATE (+) again. The year goes back 99 years.
(3) Go to step 6.

When in 2000

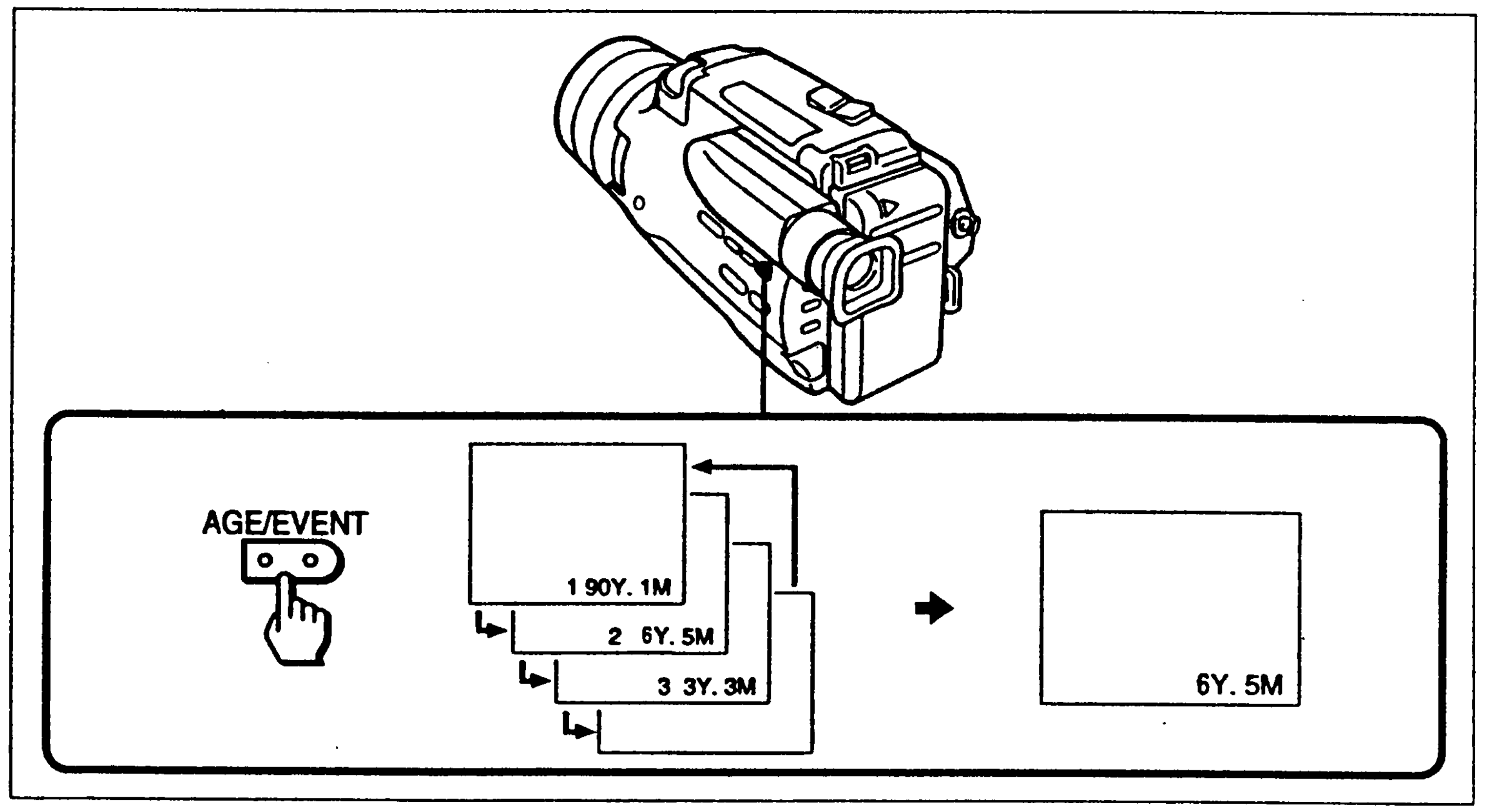
"--- -- 1901" is displayed in step 3. After that, it advances every year as "1902, 1903 ......"

To Cancel the Stored Birth Date

(1) Press AGE/EVENT and TIME (NEXT) simultaneously to make 1 BIRTHDAY appear in the viewfinder. Press DATE (+) to select a birth date to cancel.
(2) Press TIME (NEXT) twice. The month indicator flashes.
(3) Press DATE (+) repeatedly until "--- --" appears.
(4) Press TIME (NEXT). The selected birth date is canceled from the memory and is not displayed when you press AGE/EVENT.

Recording with the Age

Make sure the age is set. While recording, press AGE/EVENT to select memory 1, 2 or 3. You can record the time elapsed since the date set, for example, your child's birthday. Except for the age, date or time (p. 20) indicator, no indicator in the viewfinder is recorded.



Note on the age indicator

Each time you press AGE/EVENT, the indicator changes from 1 "The first age" to 2 "The second age," 3 "The third age" and back to no indicator. Items for which no setting has been made will be skipped. The 1, 2 or 3 indicator disappears after one second.

To Stop Recording with the Age

Press AGE/EVENT repeatedly until the age indicator disappears.

To Correct the Age Settings while Recording

Press AGE/EVENT repeatedly until the desired age appears. The recording starts after the 1, 2 or 3 indicator disappears.

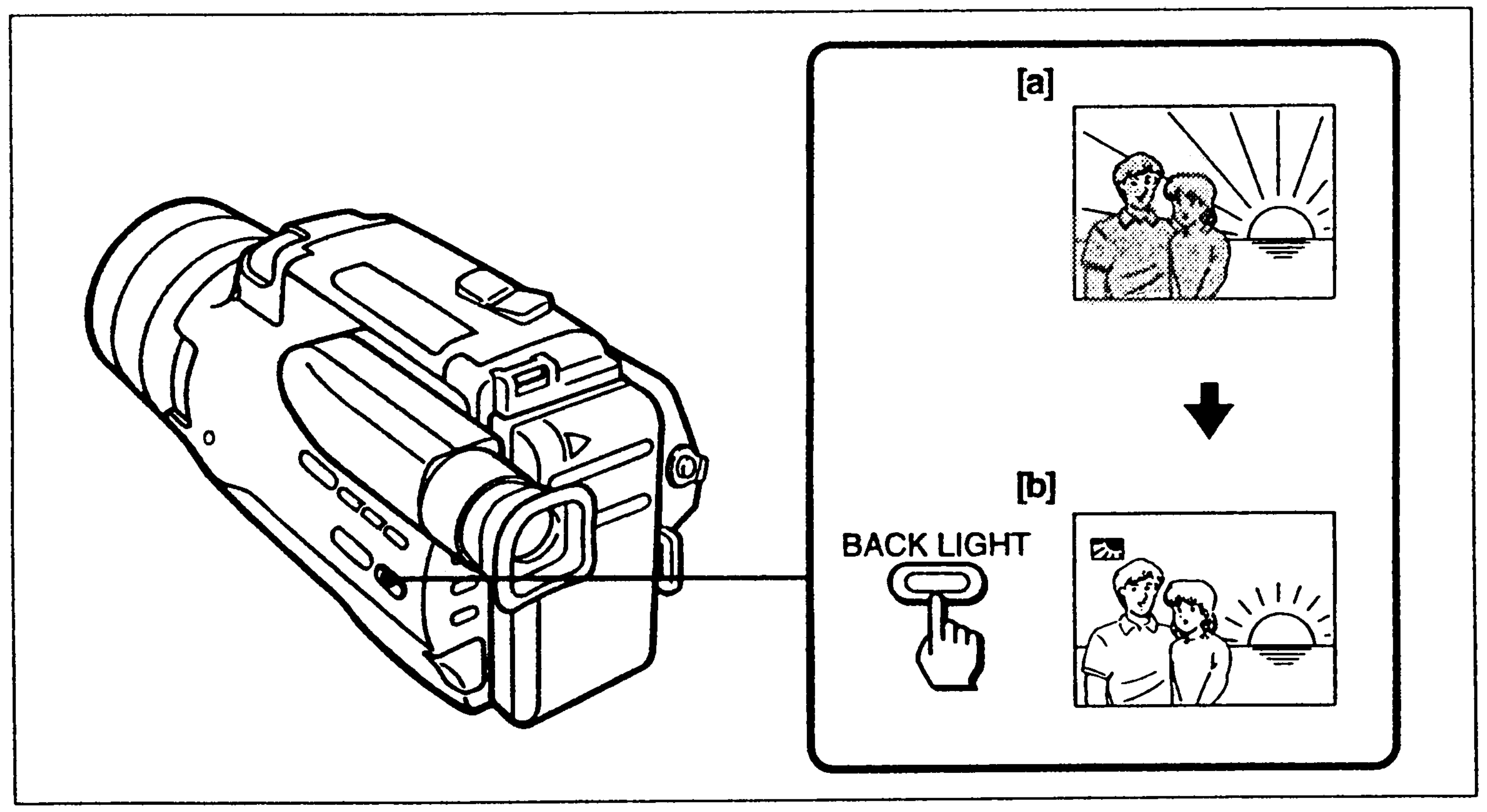
When the camcorder is connected to a TV

The age indicator appears on the TV screen after the 1, 2 or 3 indicator disappears in the viewfinder screen.

Shooting with Backlighting

When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT function.

Press BACK LIGHT. The ▨ indicator appears in the viewfinder.



[a] Subject is too dark because of backlight.
[b] Subject becomes bright with backlight compensation.

After shooting

Be sure to release this adjustment condition by pressing BACK LIGHT again. The ▨ indicator in the viewfinder disappears. Otherwise, the picture will be too bright under normal lighting condition.

This function is also effective under the following conditions:

- On snow, e.g. at a ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.

Using the PROGRAM AE Function

You can select from four PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can get a Portrait effect (the subject is in focus and the background is out of focus), capture high-speed action, or record night views.

Selecting the Best Mode

Select one of four modes, referring to the following.

Portrait mode
- A still subject such as a person or a flower
- Zooming in on a subject in the telephoto mode
- A subject behind an obstacle such as a net

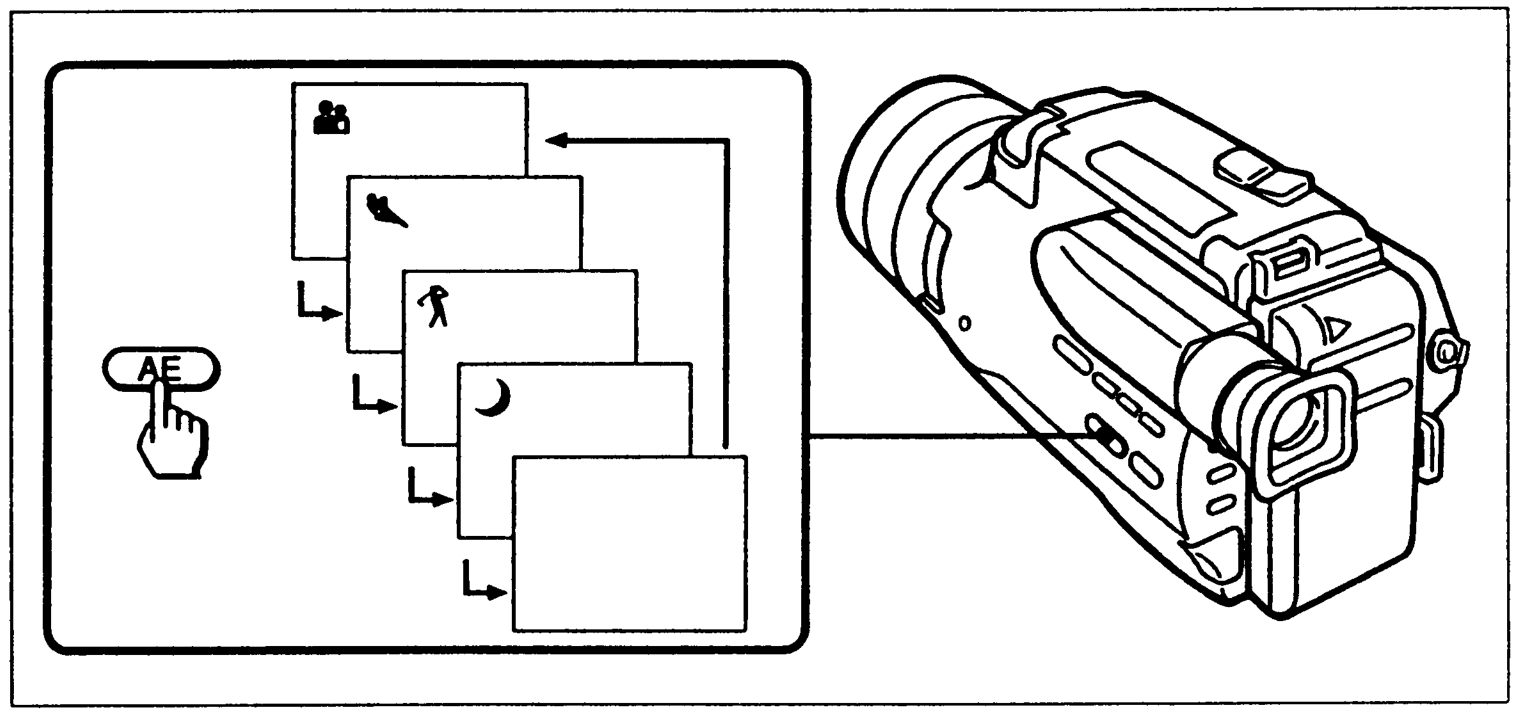
Sports mode
- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape from a moving car

High-speed shutter mode
- A golf swing or a tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in a clear, sharp picture

☽ **Twilight mode**
- Recording night views, neon signs or fireworks

Using the PROGRAM AE Function

Press PROGRAM AE. The indicator of the selected PROGRAM AE mode appears in the viewfinder.



Note on shutter speed
The shutter speed in each PROGRAM AE mode is as follows:

Portrait mode — between 1/60 to 1/2000
Sports mode — between 1/60 to 1/500
High-speed shutter mode — 1/4000
Twilight mode — 1/60
Normal mode — 1/60

Fade-in and Fade-out

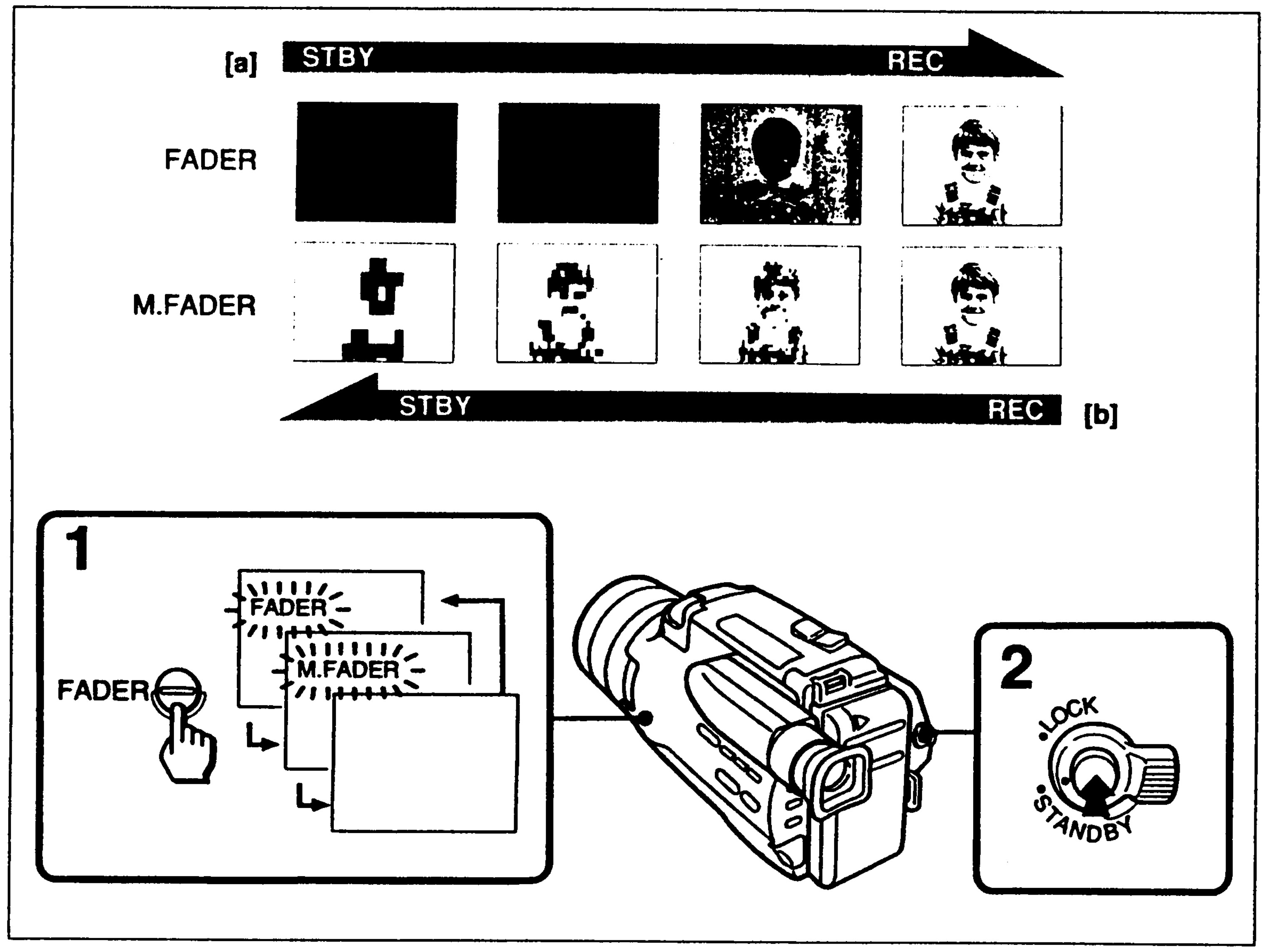
You can fade in or out to give your recording a professional appearance.
When fading in, the picture gradually fades in from black or mosaic while the sound increases. When fading out, the picture gradually fades to black or mosaic while the sound decreases.

When Fading in [a]

(1) While the camcorder is in Standby mode, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to start recording. The fade indicator stops flashing.

When Fading out [b]

(1) During recording, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to stop recording. The fade indicator stops flashing, and then recording stops.


[a]
STBY
REC
FADER
M.FADER
STBY
REC
[b]
1
FADER
FADER
M.FADER
2
LOCK
STANDBY

To Cancel the Fade-in/Fade-out Function

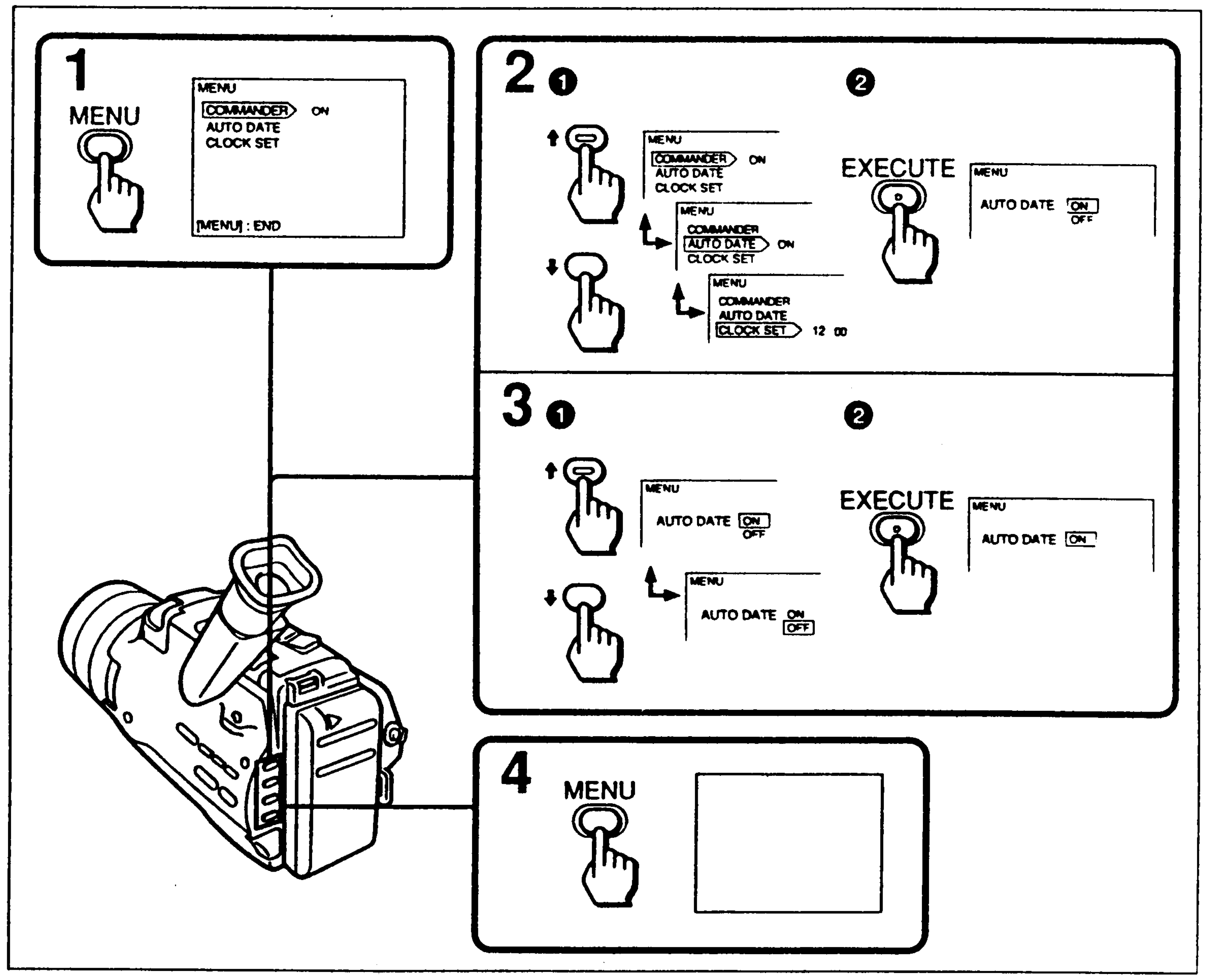
Before pressing START/STOP, press FADER until the fade indicator disappears.

When the date/time or age indicator is displayed

The date/time or age indicator does not fade in nor fade out.

Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions of the camcorder.
(1) Press MENU to display the menu in the viewfinder.
(2) Press ⬆ or ⬇ to select the desired item, then press EXECUTE.
(3) Press ⬆ or ⬇ to set the desired mode, then press EXECUTE. If you want to change the other modes, repeat steps 2 and 3.
(4) Press MENU to erase the menu display.


1
MENU
MENU
COMMANDER ON
AUTO DATE
CLOCK SET
MENU : END
2 ❶
❷
EXECUTE
AUTO DATE ON OFF
12 00
3 ❶
❷
EXECUTE
AUTO DATE ON OFF
4
MENU

Note on BACK UP

When the BACK UP indicator appears on the menu display, the settings are retained even when the battery is removed, as long as the lithium battery is in place.

Selecting the Mode Setting of Each Item

Item for both PLAYER and CAMERA Mode

COMMANDER <ON/OFF>
- Select ON when using the supplied Remote Commander for the camcorder.
- Select OFF when not using the Remote Commander.

(to be continued)

Changing the Mode Settings

Items for CAMERA Mode only

AUTO DATE <ON/OFF>
- Select ON to record the date for 10 seconds after recording has started.
- Select OFF to not record the date.

CLOCK SET
- Select this item to reset the date or time.

Items for PLAYER Mode only

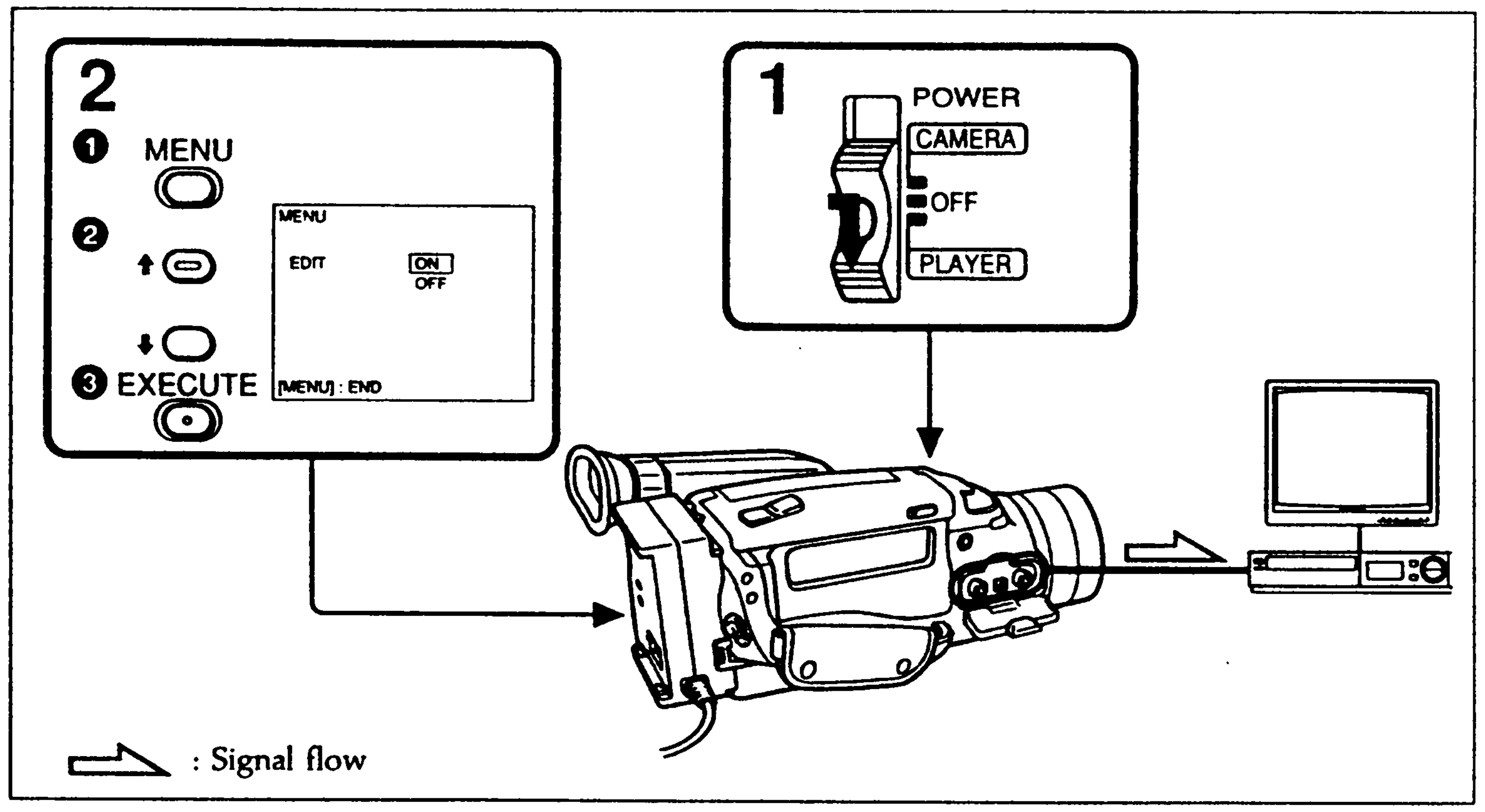
EDIT <ON/OFF>
- Select ON to minimize picture deterioration when editing.
- Normally select OFF.

Editing onto Another Tape

You can create your own video program by editing with any other 8 8 mm, Hi8 Hi8, VHS VHS, SVHS S-VHS, VHSC VHSC, SVHSC S-VHSC, B Betamax or ED Beta ED Betamax VCR that has audio/video inputs.

Before Editing

Connect the camcorder to the VCR using the supplied A/V connecting cable (p. 16).
Set the input selector on the VCR to LINE, if available.
(1) Set the POWER switch to PLAYER.
(2) Set EDIT to ON in the menu system (p. 28).



: Signal flow

Starting Editing

(1) Insert a blank tape (or a tape you want to record over) into the VCR, insert your recorded tape into the camcorder.
(2) Play back the recorded tape on the camcorder until you locate the point where you want to start editing, then set the camcorder in the Playback pause mode.
(3) On the VCR, locate the recording start point and set the VCR in the recording pause mode.
(4) Press ❚❚ on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes

Repeat steps 2 to 4.

To Stop Editing

Press ■ on both the camcorder and the VCR.

Use of the EDITSEARCH button

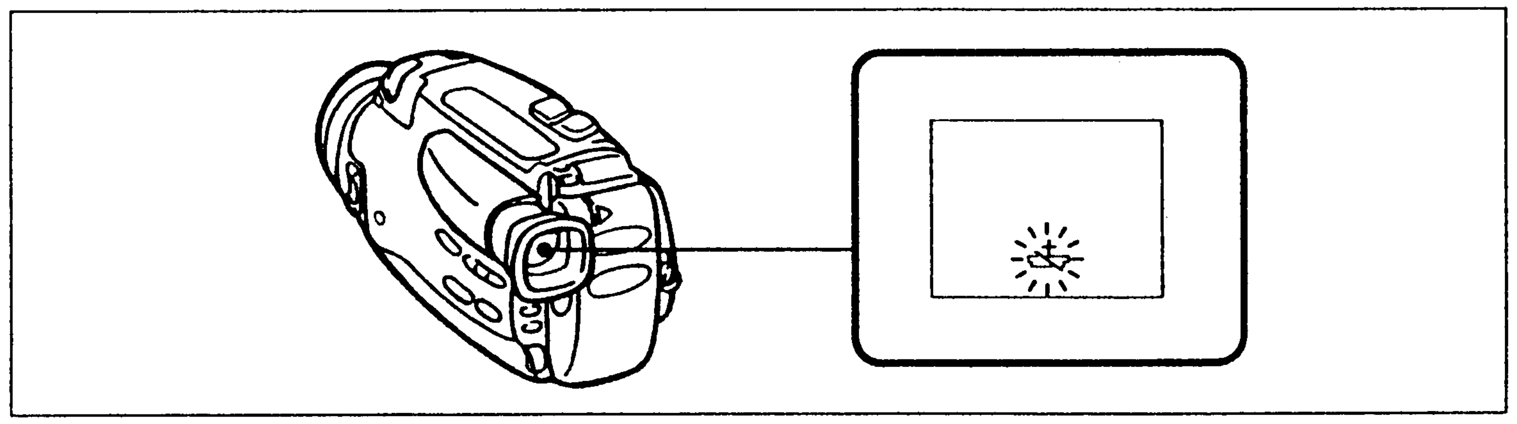
You can play back the tape in normal/reverse direction by holding down EDITSEARCH during Playback pause mode. You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Note on the DISPLAY function

If you have displayed the viewfinder screen indicators on the TV, erase the indicators by pressing DISPLAY on the Remote Commander so that they will not be superimposed on the edited tape.

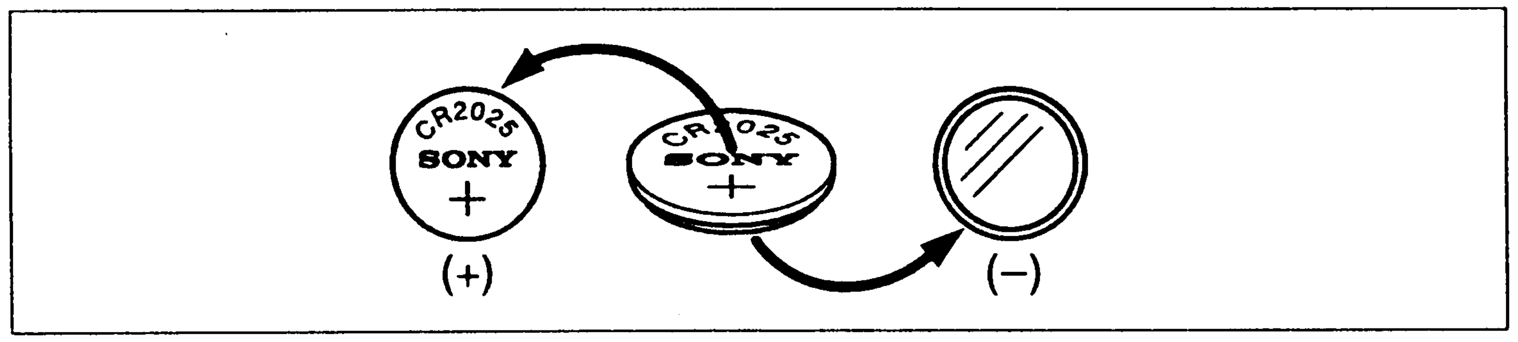
Changing the Lithium Battery

Your camcorder is supplied with a lithium battery installed. The lithium battery for the camcorder lasts for about 1 year under normal operation. When the battery becomes weak or dead, the indicator flashes in the viewfinder for about 5 seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**



Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (–) side as illustrated. Be sure to insert the lithium battery with the positive side facing out.


CR2025
SONY
+
(+)
(–)

WARNING

The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

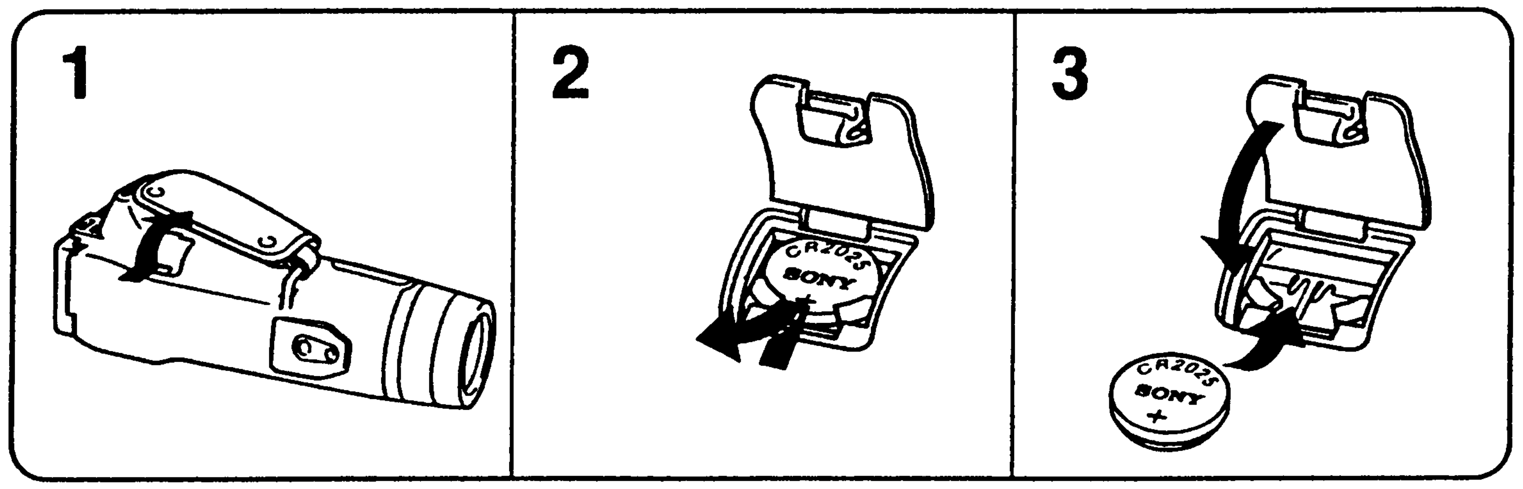
Caution

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

Changing the Lithium Battery

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time, age and other BACK UP items in the menu system.

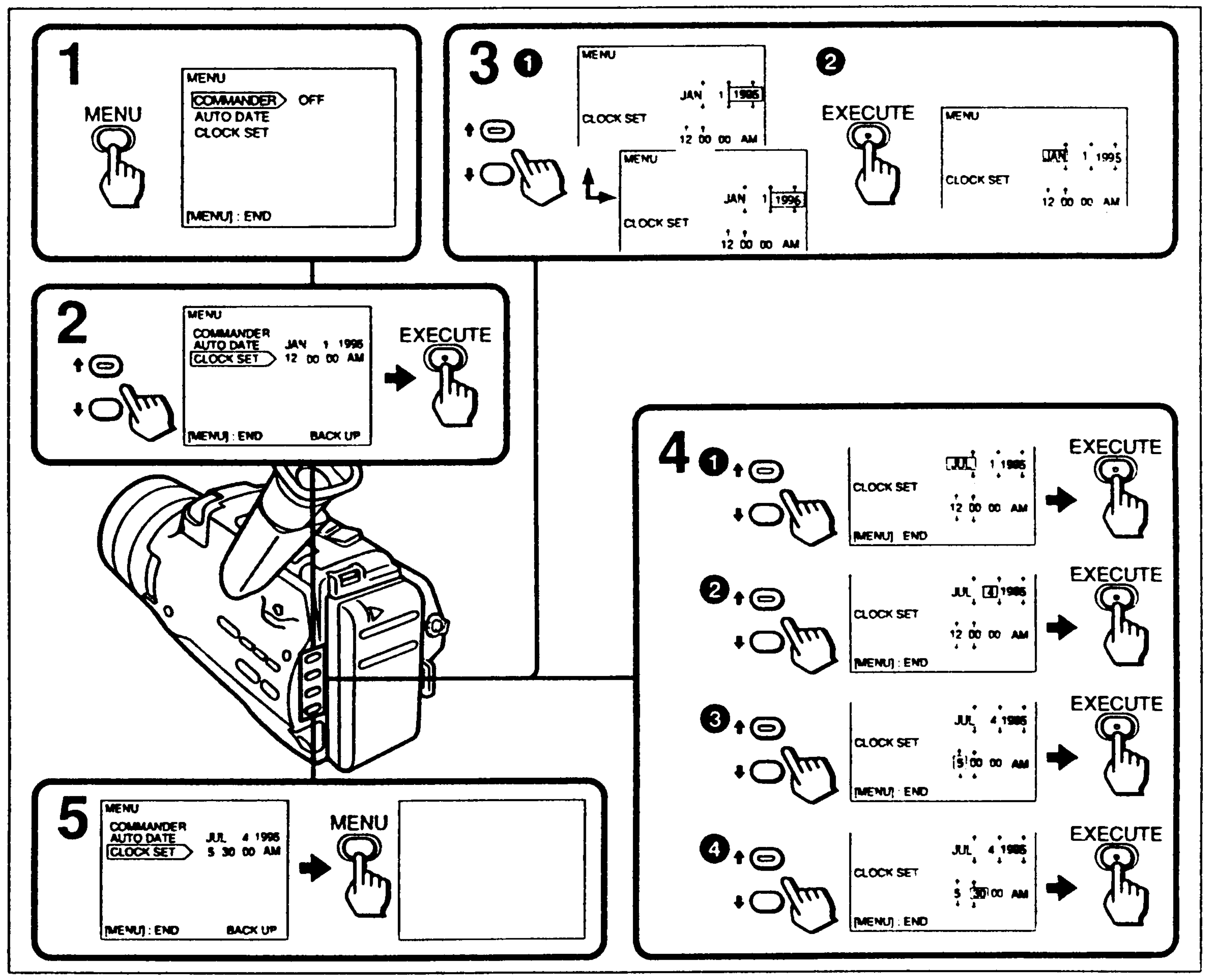
(1) Open the lid of lithium battery compartment under the grip strap of the camcorder.
(2) Push the battery down once and pull it out from the holder.
(3) Install the lithium battery with the positive (+) side facing out. Close the lid.


1
2
3
CR2025
SONY
+

Resetting the Date or Time

You can reset the date or time in the menu system.

(1) Press MENU to display the menu in the viewfinder.
(2) Select CLOCK SET, then press EXECUTE.
(3) Press ↑ or ↓ to adjust the year, and then press EXECUTE.
(4) Press ↑ or ↓ to adjust the month, day, hour and minutes, and then press EXECUTE. Note that when you keep ↑ or ↓ pressed, the indications in the menu display advance faster.
(5) Press MENU to erase the menu display.


1
MENU
MENU
COMMANDER OFF
AUTO DATE
CLOCK SET
[MENU] : END
2
EXECUTE
MENU
COMMANDER
AUTO DATE JAN 1 1995
CLOCK SET 12 00 00 AM
[MENU] : END BACK UP
3 ❶
MENU
CLOCK SET JAN 1 1995 12 00 00 AM
❷
EXECUTE
4 ❶
❷
❸
❹
EXECUTE
CLOCK SET
[MENU] : END
5
MENU
COMMANDER
AUTO DATE JUL 4 1995
CLOCK SET 5 30 00 AM
[MENU] : END BACK UP
MENU

To Check the Preset Date and Time

Press DATE (+) to display the date indicator in the viewfinder.

Press TIME (NEXT) to display the time indicator. When you press the same button again, the indicator goes off.

Note on the setting of the year

When you set the year, each time you press DATE (+) the digits change as follows.

$$1995 \rightarrow 1996 \rightarrow ---- \rightarrow 2024$$

Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle.
12:00 AM stands for midnight.
12:00 PM stands for noon.

Playback Modes

The playback mode (SP or LP) is selected automatically according to the format in which the tape has been recorded. The quality of the recorded picture in LP mode, however, will not be as good as that in SP mode.

LP (long play) mode

When you play back a tape recorded in LP mode, the LP indicator lights up in the viewfinder. This camcorder cannot record a tape in LP mode.

Foreign 8 mm video

You cannot play back software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to play back foreign pre-recorded software. Refer to page 39 to check the TV color system of foreign countries.

Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment

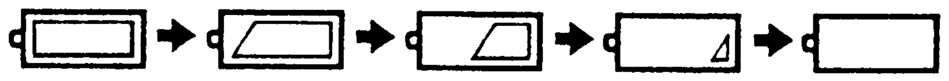
Battery efficiency is decreased and the battery will be used up more quickly if you are recording in a cold environment.

To Save Battery Power

Turn STANDBY on the camcorder down when not recording to save battery power (p. 34) **[a]**.
A smooth transition between scenes can be made even if recording is stopped and started again.
While you are positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator in the viewfinder decreases gradually as battery power is used up.



When the remaining battery indicator reaches the lowest point, the ▭ indicator appears and starts flashing in the viewfinder (p. 34) **[b]**.
When the ▭ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain a smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with its own indicator (not supplied). The indicator on the battery pack is more accurate.

Notes on the Rechargeable Battery Pack

The Battery Pack Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Pack Care

- Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery pack right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery pack. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself) (p. 34) **[c]**.

The Life of the Battery Pack

The battery pack can be fully charged and discharged about 500 times under normal temperatures. If the battery indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperature require a longer charging time.

Sony Batteries are Recommended

Use of non-Sony batteries may damage your Handycam camcorder.

Tips for Using the Battery Pack

Notes on Charging

A Brand-new Battery Pack

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the ▭ indicator appears in the viewfinder, you should remove the tape, slide the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the battery indicator flashes rapidly.
- When you use the AC-S10 power adaptor or the BC-S10 portable battery charger, you can use the discharging function.
- **Charging a usable battery pack causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery pack again.**

After Long Storage

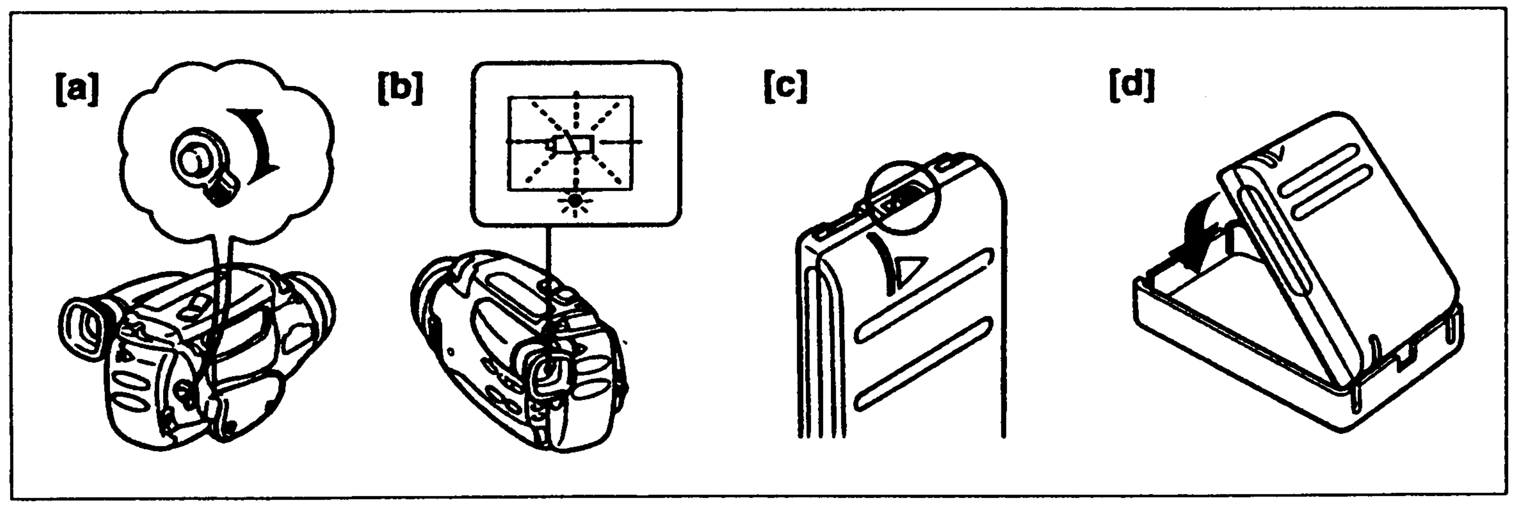
Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. When the terminals are not clean or when the battery pack has not been used for a long time, repeatedly install and remove the battery pack. This improves the contact condition. Also, wipe the + and – terminals with a soft cloth or paper.

Be Sure to Observe the Following

- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. When carrying the battery pack, attach the terminal cover [d].**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.



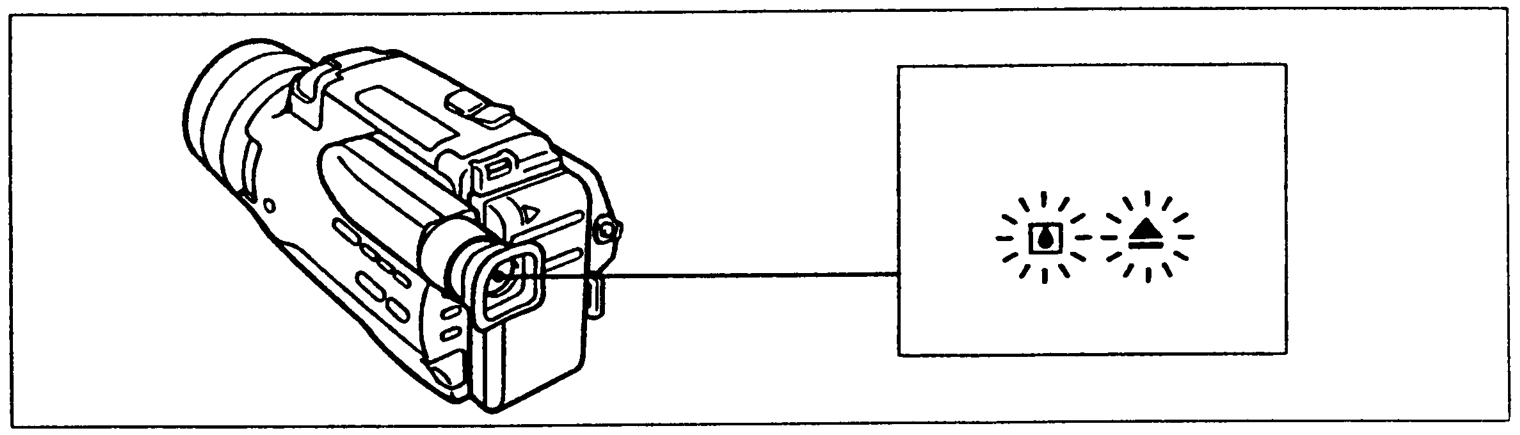
Maintenance Information and Precautions

Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the Camcorder

When the ▣ and ⏏ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour. The camcorder can be used again if the ▣ indicator does not appear when the power is turned on again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert the cassette and press a tape transport button (▷ PLAY, etc.), the ⏏ indicator in the viewfinder flashes.
In this case, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour. The camcorder can be used again if the ⏏ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

On the Lens

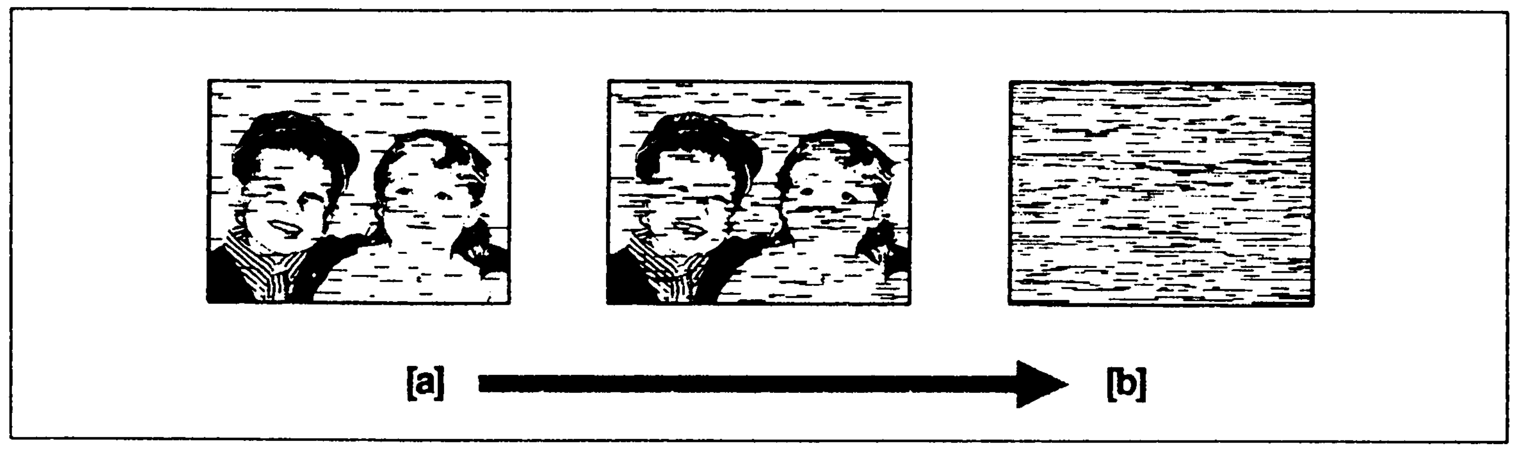
If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
(1) Be sure to tightly seal the plastic bag containing the camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

Video Head Cleaning

To ensure normal recording and clear pictures, clean the video heads often. When the ⊗ indicator in the viewfinder flashes or playback pictures are "noisy" or hardly visible, the video heads may be dirty.



[a] Slightly dirty
[b] Very dirty

If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy," repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution

Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

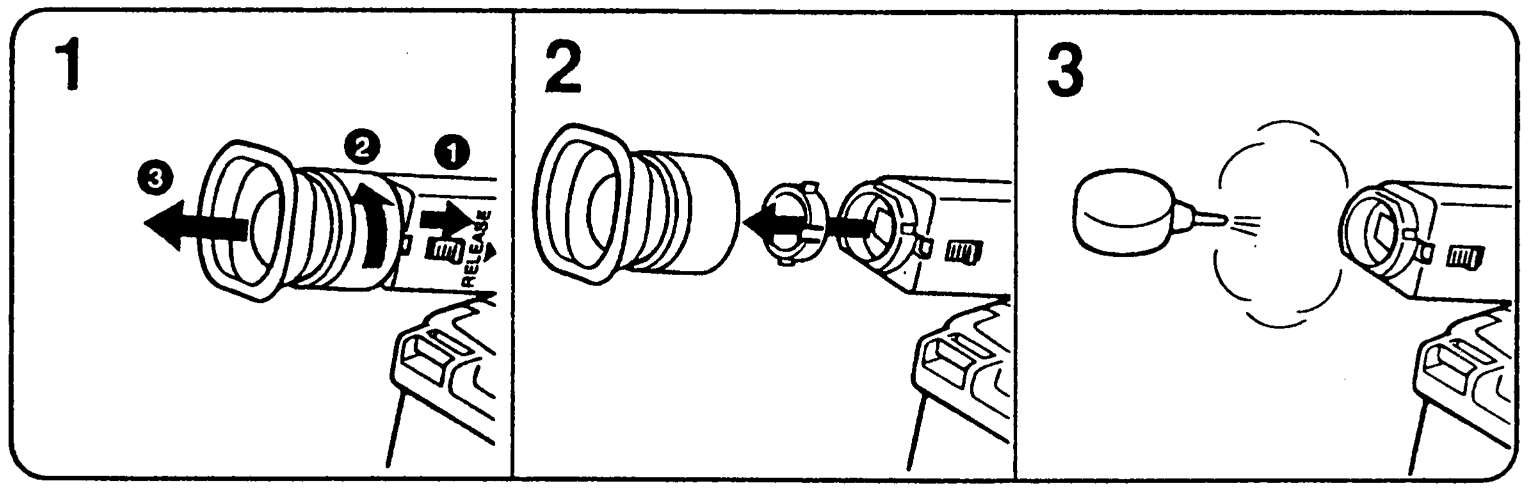
Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

Removing Dust from Inside the Viewfinder

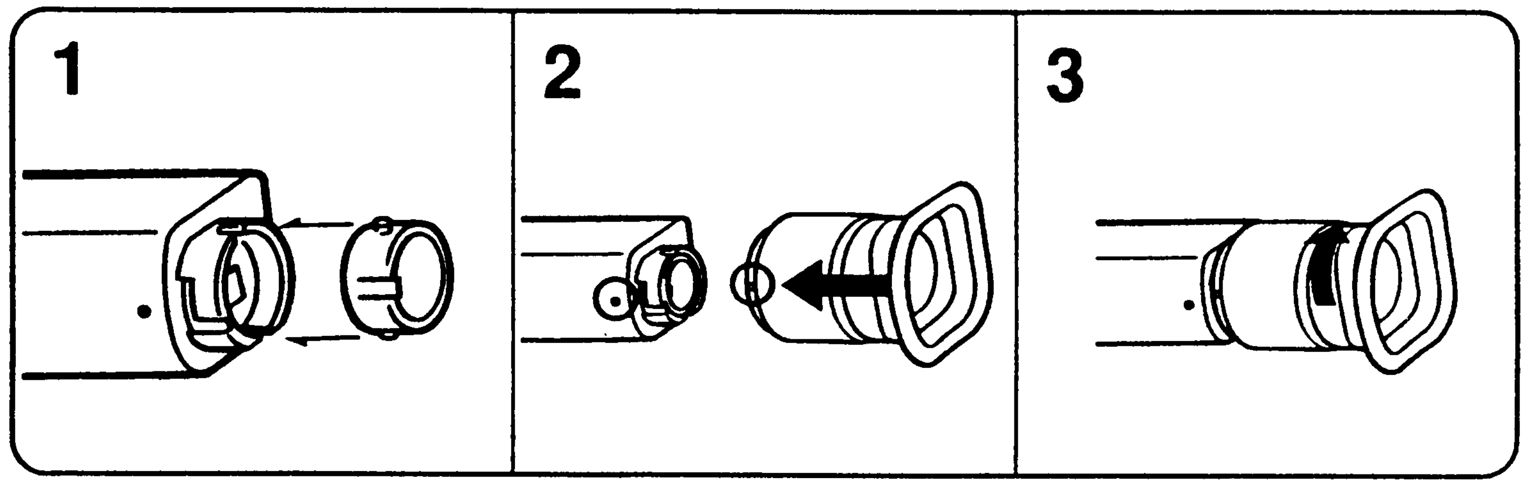
When Using a Monochrome Viewfinder — For CCD-FX240

(1) While holding down the switch on the viewfinder barrel, turn the eyecup in the direction of the arrow and pull it out.
(2) Remove the small lens from inside the viewfinder.
(3) Clean the surface with a commercially available blower.



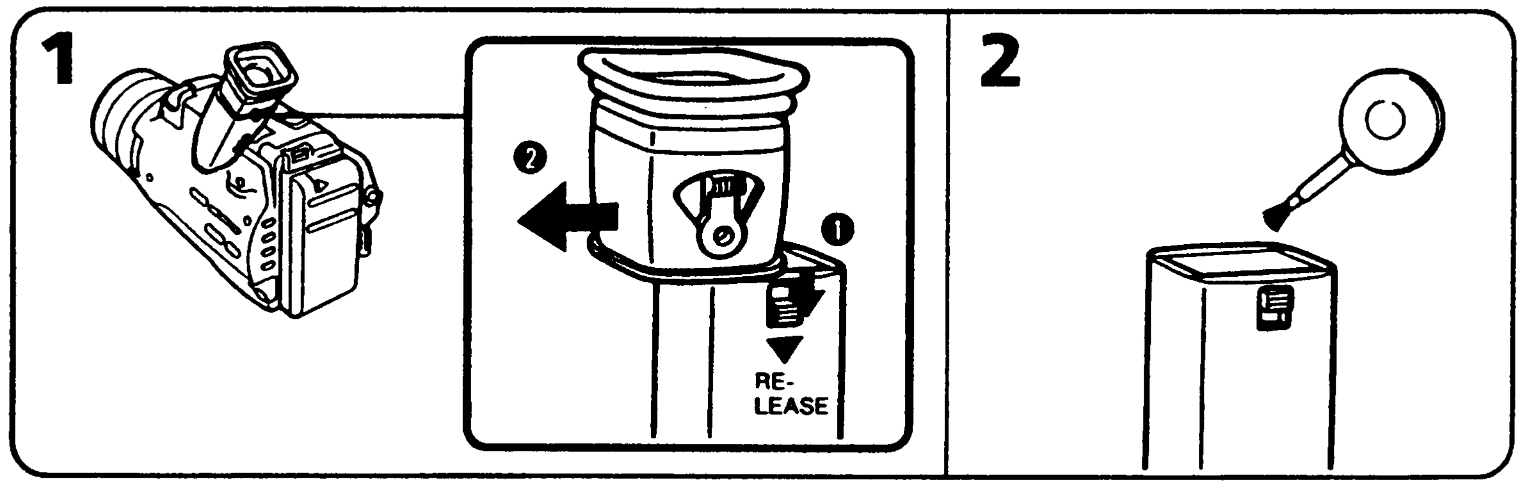
To Reattach the Eyecup

(1) Replace the small lens inside the viewfinder. Be sure to replace it with the correct side.
(2) Align the groove on the eyecup with the ● mark on the barrel.
(3) Turn the eyecup clockwise.



When Using a Color Viewfinder — For CCD-FX340

(1) While pressing down the hook, slide the viewfinder barrel in the direction of the arrow and remove it from the viewfinder.
(2) Clean the surface with a commercially available blower.



To reattach the viewfinder barrel

Slide the viewfinder barrel in the opposite direction of the arrow in the above illustration.

Maintenance Information and Precautions

Precautions

Camcorder Operation

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid get inside the casing, unplug the camcorder and have it checked by Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.

On Handling Tapes

Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, if the tab is out or in, etc.

Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

AC Power Adaptor

Charging

- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery pack on a flat surface without vibration.
- The battery pack will get hot during charging. This is normal.

Others

- Model for the USA and Canada: One blade of the plug is wider than the other for safety purposes and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

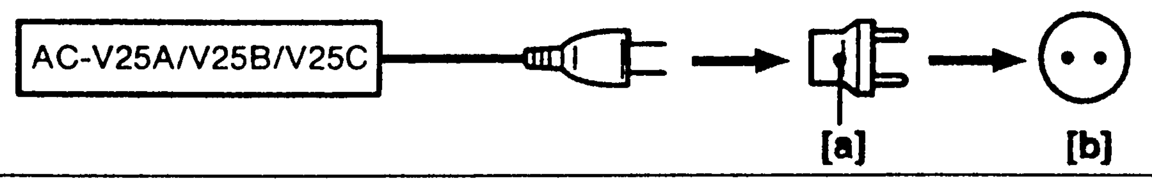
If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electric and TV color systems. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.
Use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.



Difference in Color Systems

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV or a PAL-M system based TV with an NTSC/PAL-M transcoder.
Check the following list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

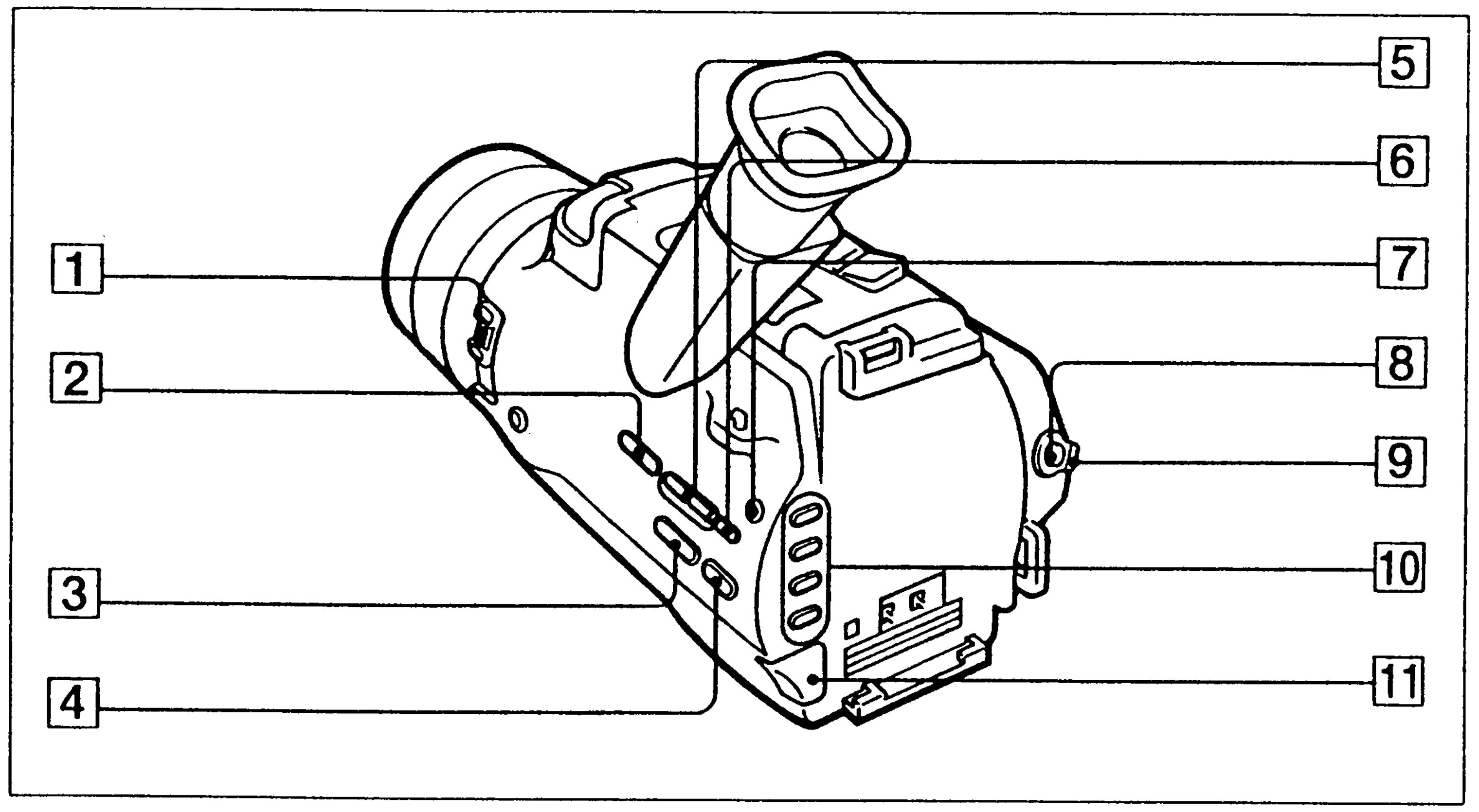
PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, former West Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

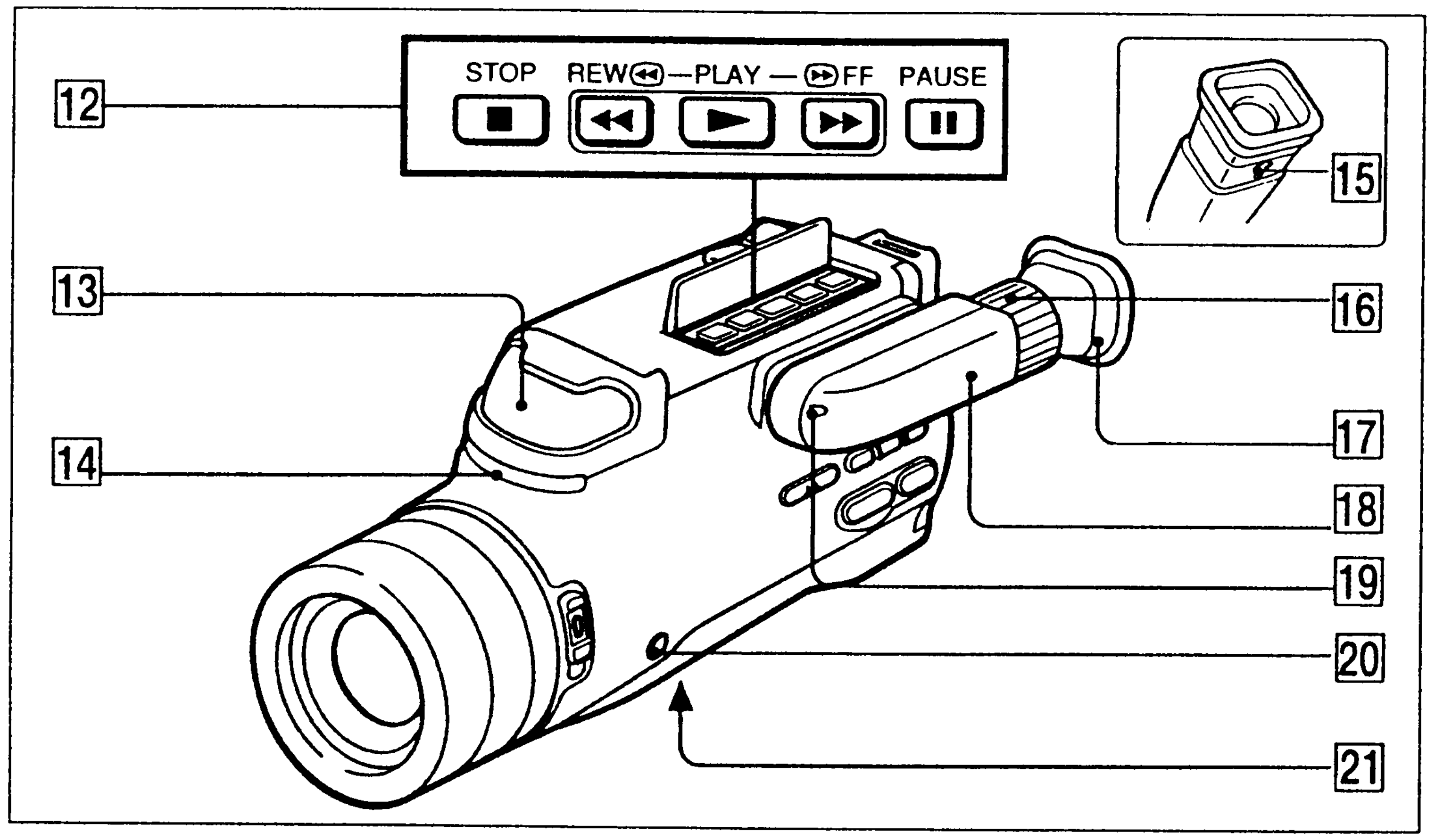
SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

Identifying the Parts

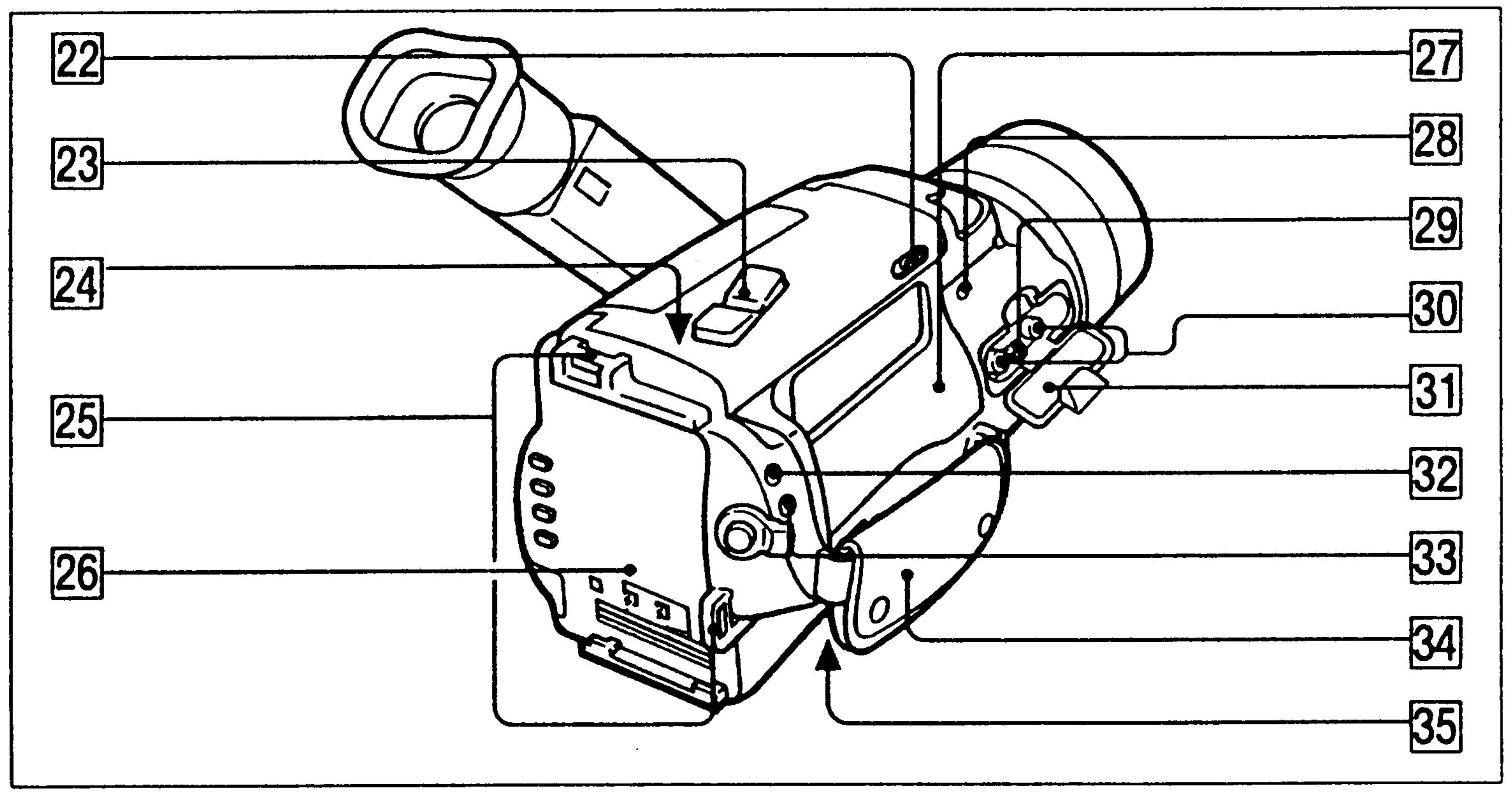


- 1 **POWER switch** (p. 11, 17)
- 2 **EDITSEARCH button** (p. 15)
- 3 **PROGRAM AE button** (p. 25)
- 4 **BACK LIGHT button** (p. 24)
- 5 **DATE (+) and TIME (NEXT) buttons** (p. 20)
- 6 **AGE/EVENT button** (p. 21)
- 7 **COUNTER RESET button** (p. 12)
- 8 **START/STOP button** (p. 11)
- 9 **STANDBY switch** (p. 11)
- 10 **Menu operation buttons** (p. 27)
- 11 **BATT (battery eject) knob** (p. 8)

Identifying the Parts



- 12 **Tape transport buttons** (p. 17)
  - ■ (stop)
  - ◀◀ REW (rewind)
  - ▶ (playback)
  - ▶▶ FF (fastforward)
  - ❚❚ PAUSE
- 13 **Built-in microphone**
- 14 **Remote sensor** (p. 50)
  Aim the Remote Commander here for remote control.
- 15 **Viewfinder lens adjustment lever (CCD-FX340)** (p. 10)
- 16 **Viewfinder lens adjustment ring (CCD-FX240)** (p. 10)
- 17 **Eyecup**
- 18 **Viewfinder** (p. 10)
- 19 **Camera recording/battery lamp**
- 20 **FADER button** (p. 26)
- 21 **Tripod receptacle** (p. 14)



22 **Lid lock** (p. 9)

23 **Power zoom button** (p. 13)

24 **Eject button (under the cover)** (p. 9)

25 **Hooks for shoulder strap** (See below.)

26 **Battery mounting surface** (p. 8)

27 **Cassette compartment** (p. 9)

28 **MIC jack (PLUG IN POWER)**
Connect an optional external microphone. This jack also accepts a "plug-in-power" microphone.

29 **RFU DC OUT (RFU adaptor DC output) jack** (p. 16)

30 **Audio/Video output jacks** (p. 16)

31 **Jack cover**

32 **LANC Ⓛ control jack**
Ⓛ stands for Local Application Control Bus System. The Ⓛ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.

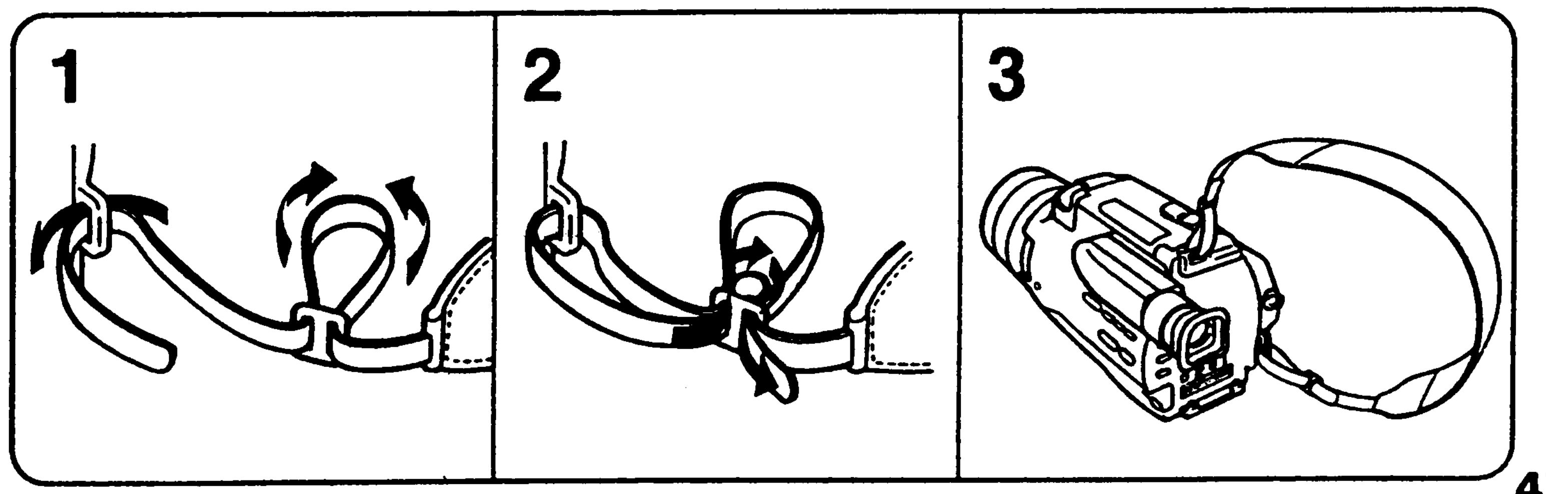
33 **🎧 (Earphone) jack**

34 **Grip strap** (p. 14)

35 **Lithium battery compartment** (p. 30)

Attaching the Shoulder Strap

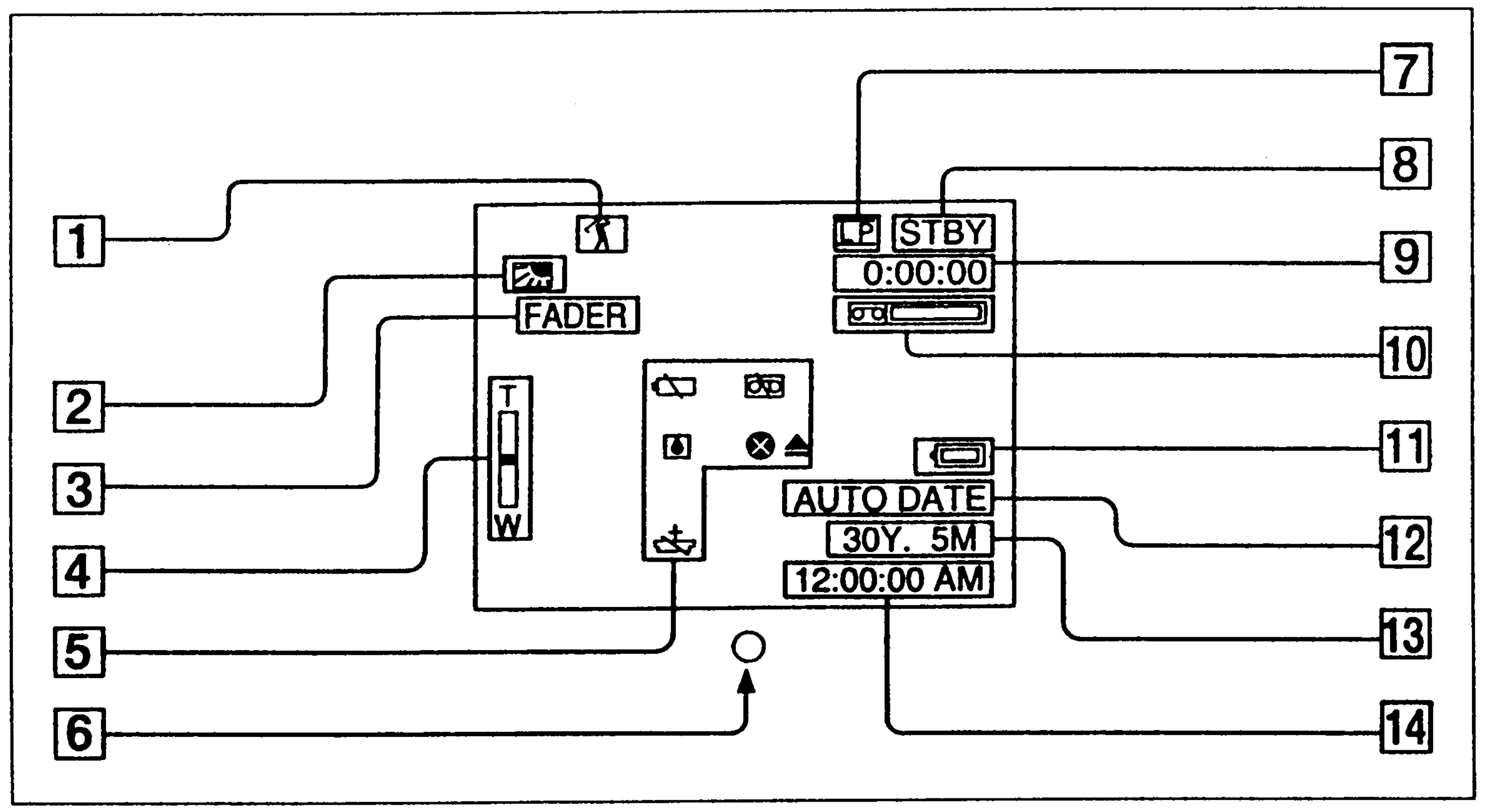
Attach the supplied shoulder strap to the hooks for the shoulder strap (25).



Identifying the Parts

Operation Indicators

For details on each indicator, refer to the pages indicated in the parentheses.



1 **PROGRAM AE indicator** (p. 25)

2 **Back Light indicator** (p. 24)

3 **FADER indicator** (p. 26)

4 **Power zoom indicator** (p. 13)

5 **Warning indicators** (p. 51)

6 **Recording lamp/Battery lamp**

7 **Lights up when playing back a tape recorded in LP mode.**

8 **Tape transport mode** (p. 11)

9 **Tape counter** (p. 12)

10 **Remaining tape indicator**

▭ → ▭ → ▭ → 5min → 0min

11 **Remaining battery indicator** (p. 33, 51)

▭ → ▭ → ▭ → ▭ → ▭

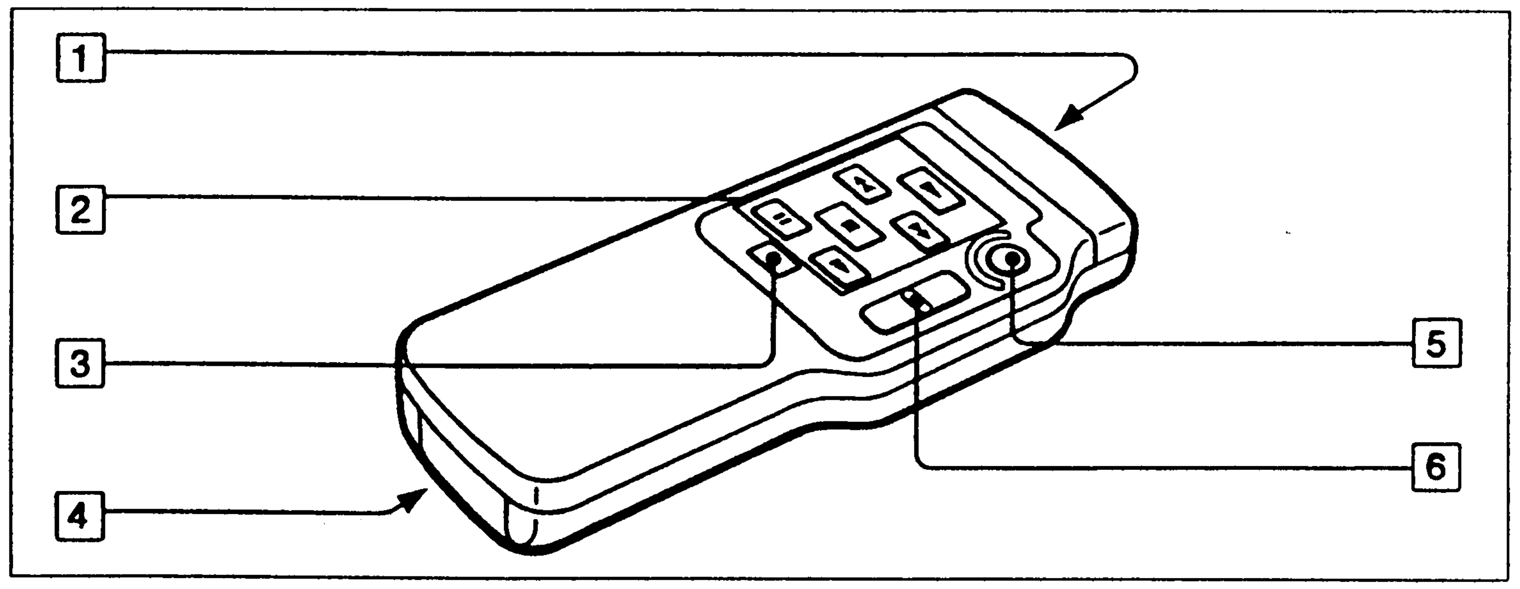
12 **AUTO DATE indicator** (p. 11, 12)

13 **AGE/EVENT indicator** (p. 21)

14 **Date or Time** (p. 20)

Remote Commander

The buttons that have the same name on the Remote Commander as on the camcorder function identically.



1 Transmitter
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.

2 Tape transport buttons

3 DISPLAY button

4 Size AA (R6) battery holder

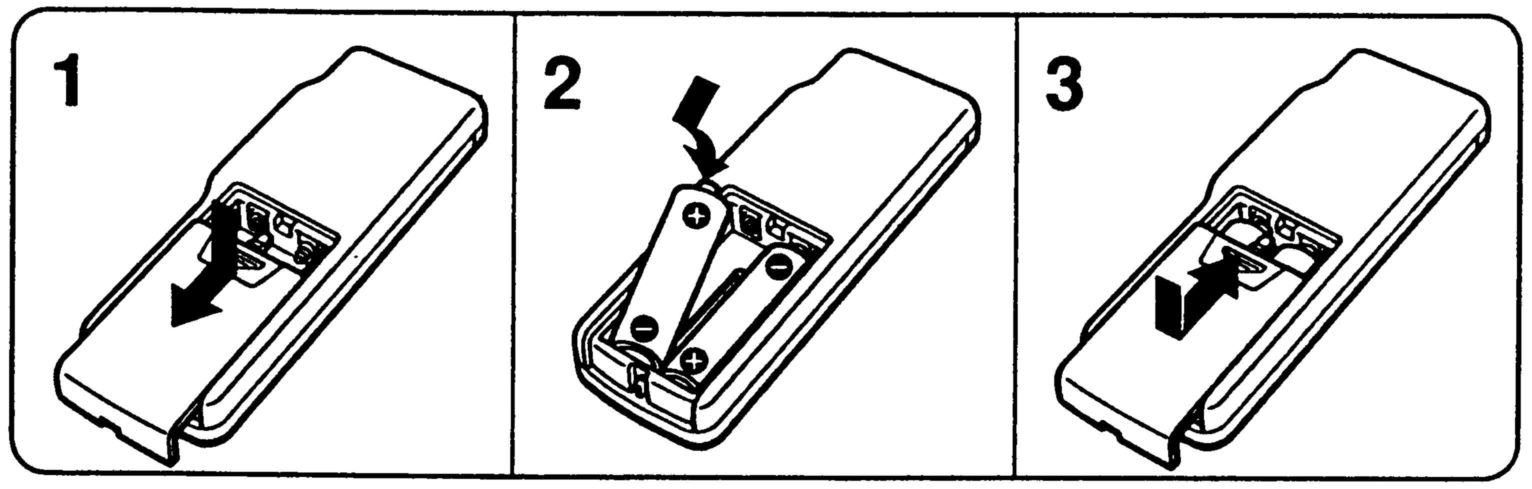
5 START/STOP button

6 Power zoom button
The zooming speed is unchangeable in the Remote Commander.

Preparing the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.

(1) Remove the battery cover from the Remote Commander.
(2) Insert both of the size AA (R6) batteries with correct polarity.
(3) Put the battery cover back onto the Remote Commander.

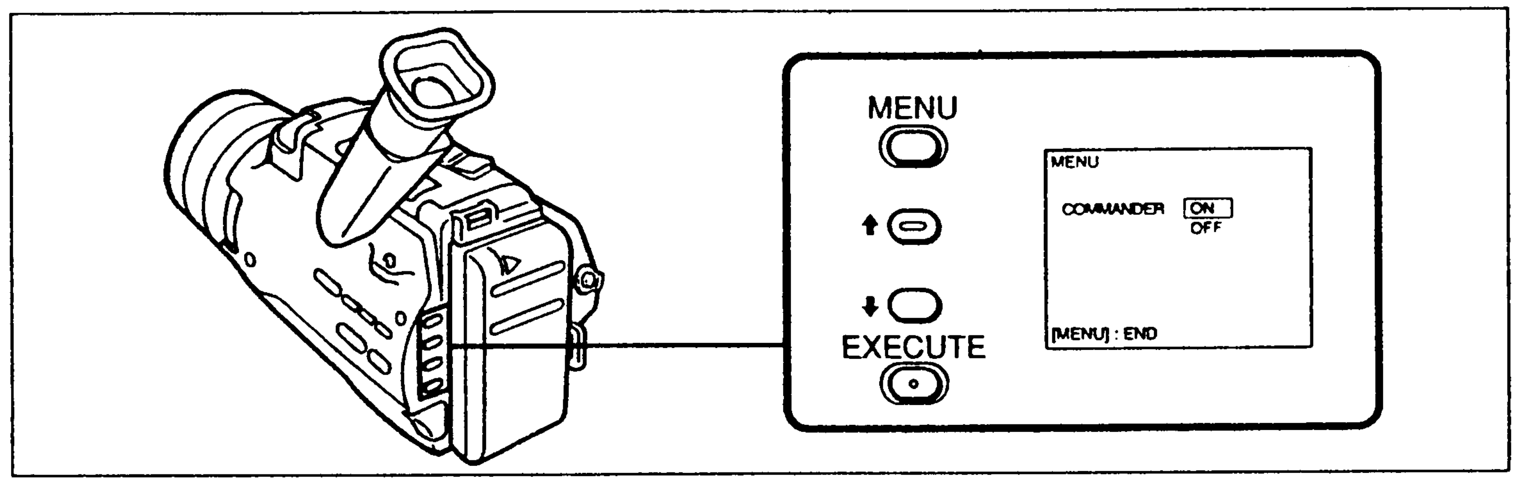


Note on battery life
The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

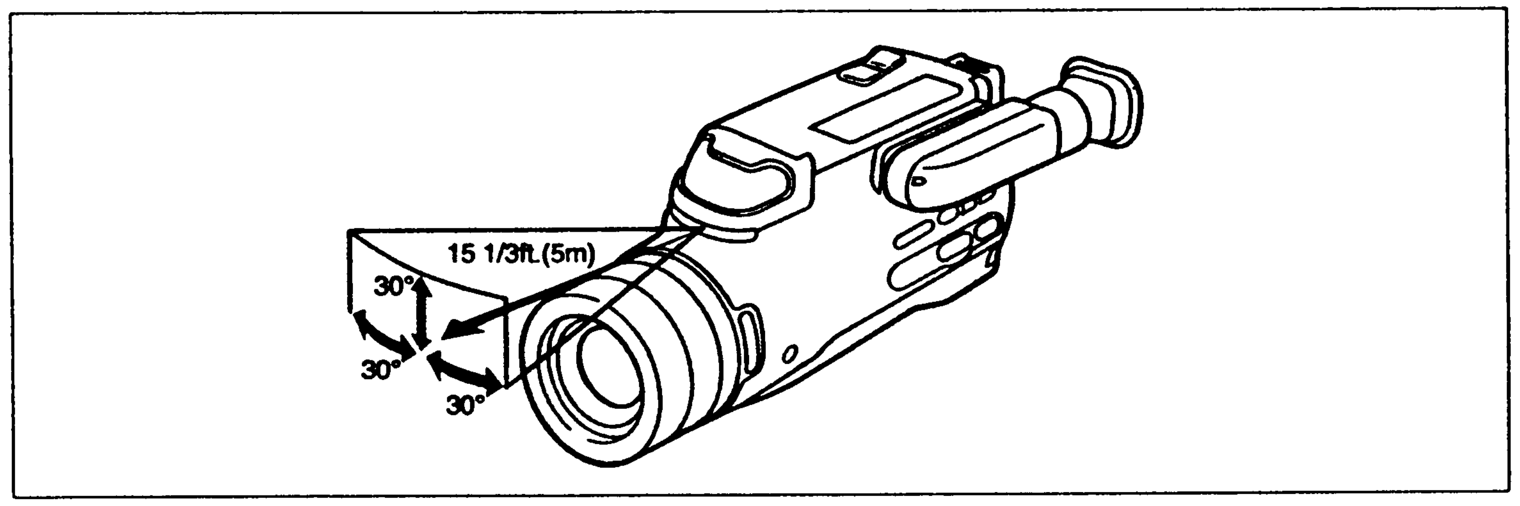
To avoid damage from possible battery leakage
Remove the batteries when you will not use the Remote Commander for a long time.

Using the Remote Commander

Make sure that the COMMANDER mode is set to ON in the menu system.



Remote Control Direction



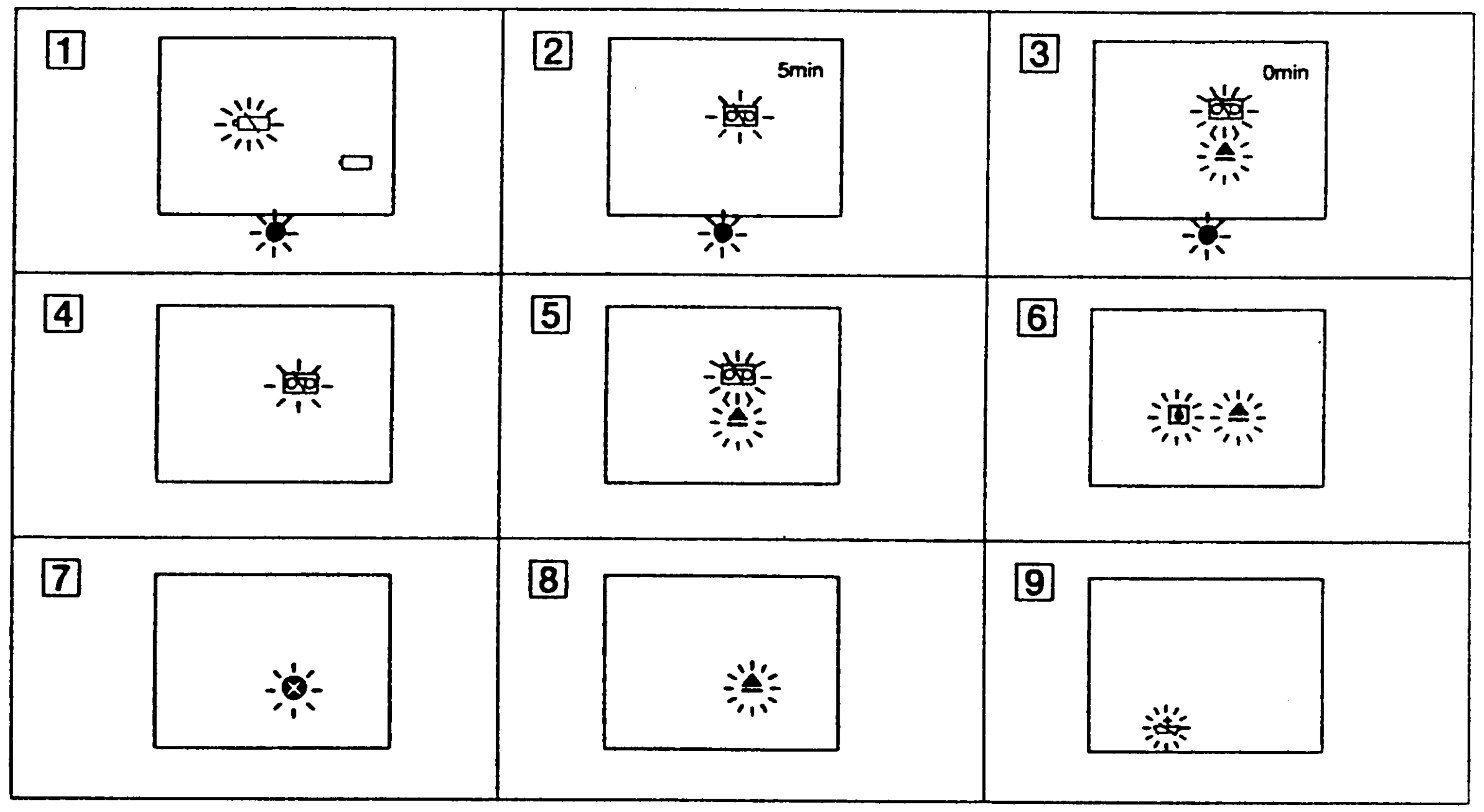
Notes on the Remote Commander

- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1, 2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

Indicators in the Viewfinder

Warning Indicators

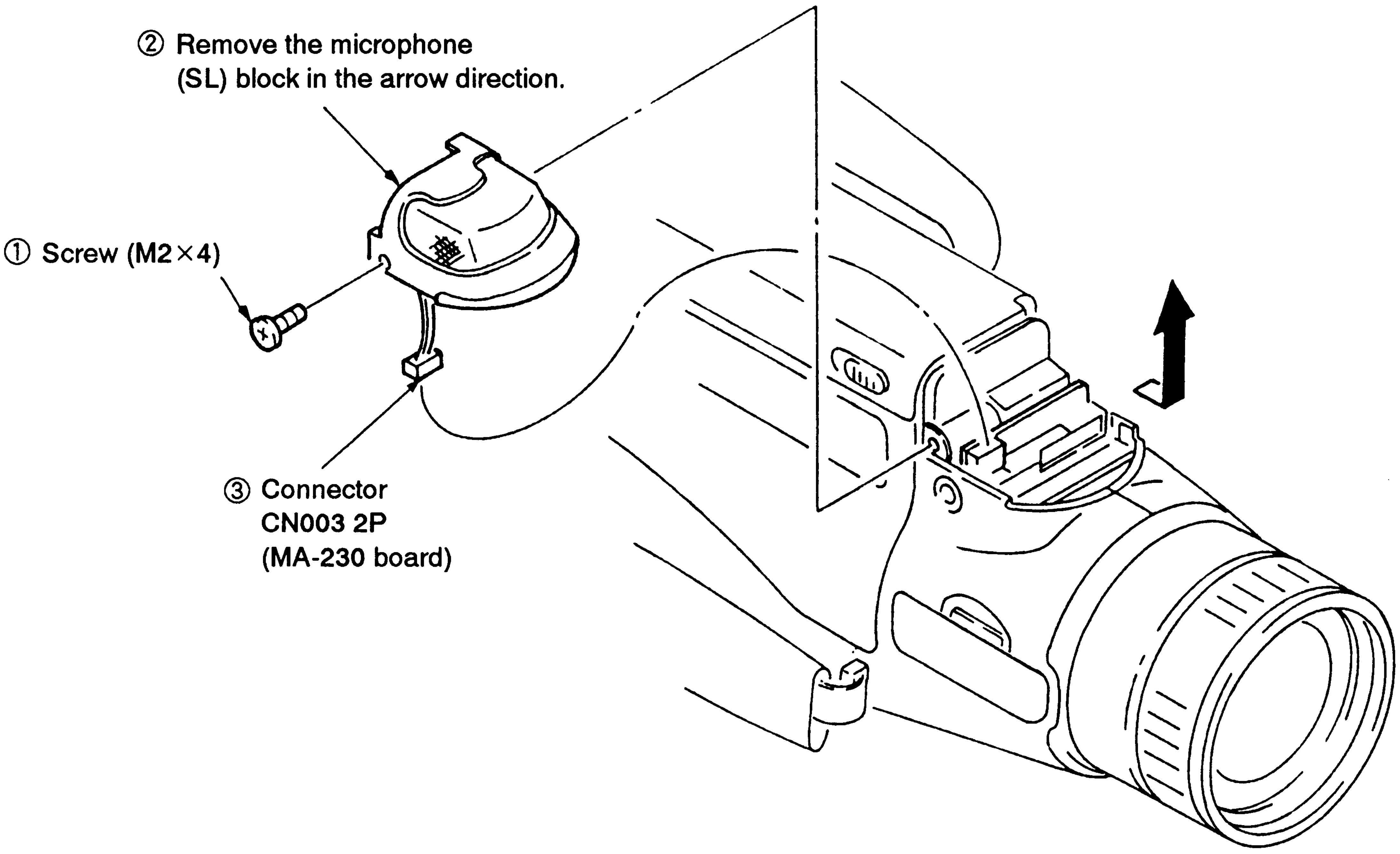
If indicators flash in the viewfinder or a caution lamp on the camcorder flashes, check the following:



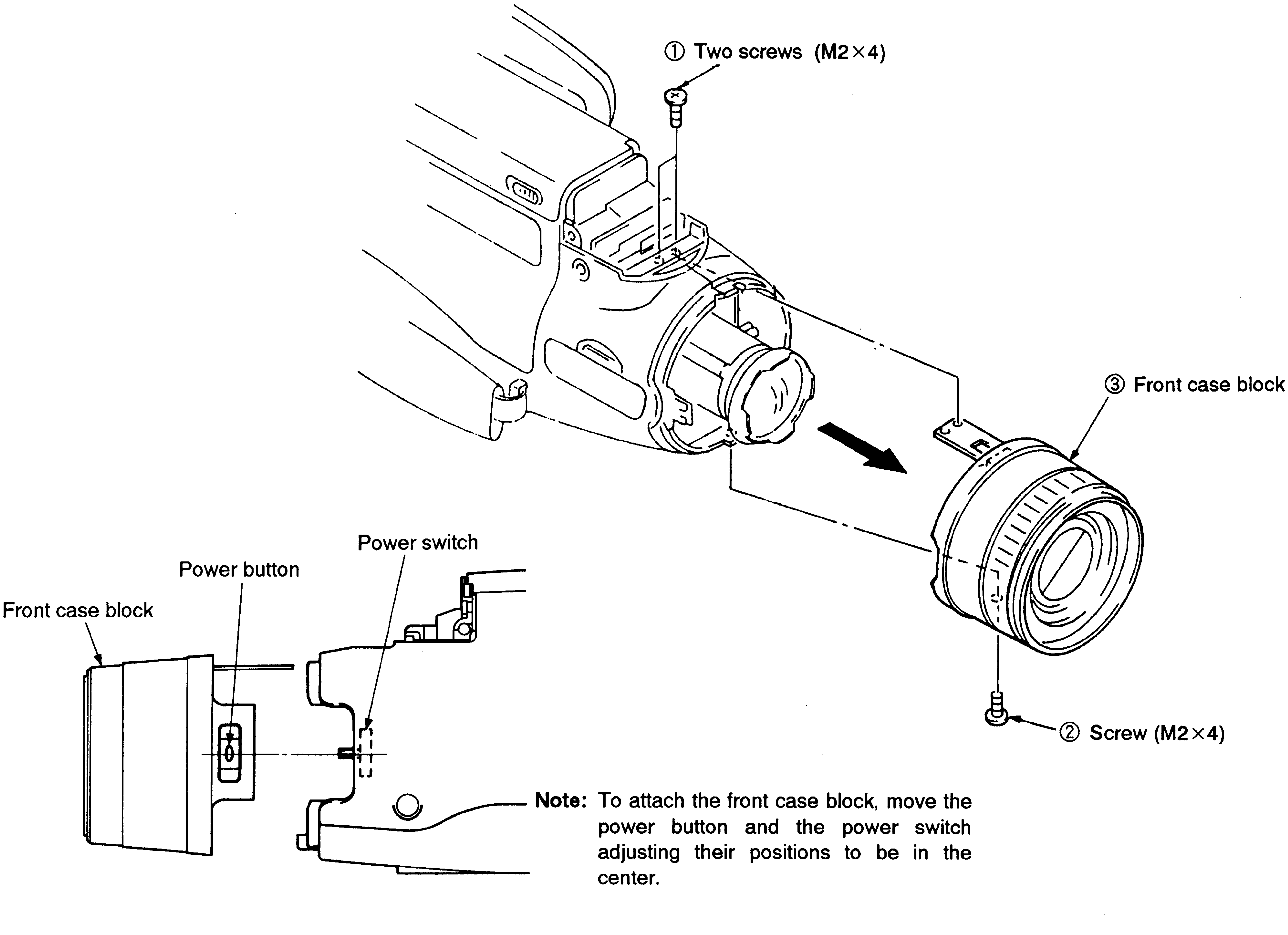
1. **The battery is weak or dead.**
   Slow flashing: The battery is weak.
   Fast flashing: The battery is dead.
2. **The tape is near the end.**
   The flashing is slow.
3. **The tape has run out.**
   The flashing becomes rapid.
4. **No tape has been inserted.**
5. **The tab on the tape is out (red).**
6. **Moisture condensation has occurred.** (p. 35)
7. **The video heads may be contaminated.** (p. 36)
8. **Some other trouble has occurred.**
   Disconnect the power source and contact your Sony dealer or local authorized facility.
9. **The lithium battery is weak or is not installed.** (p. 30)

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF MICROPHONE (SL) BLOCK

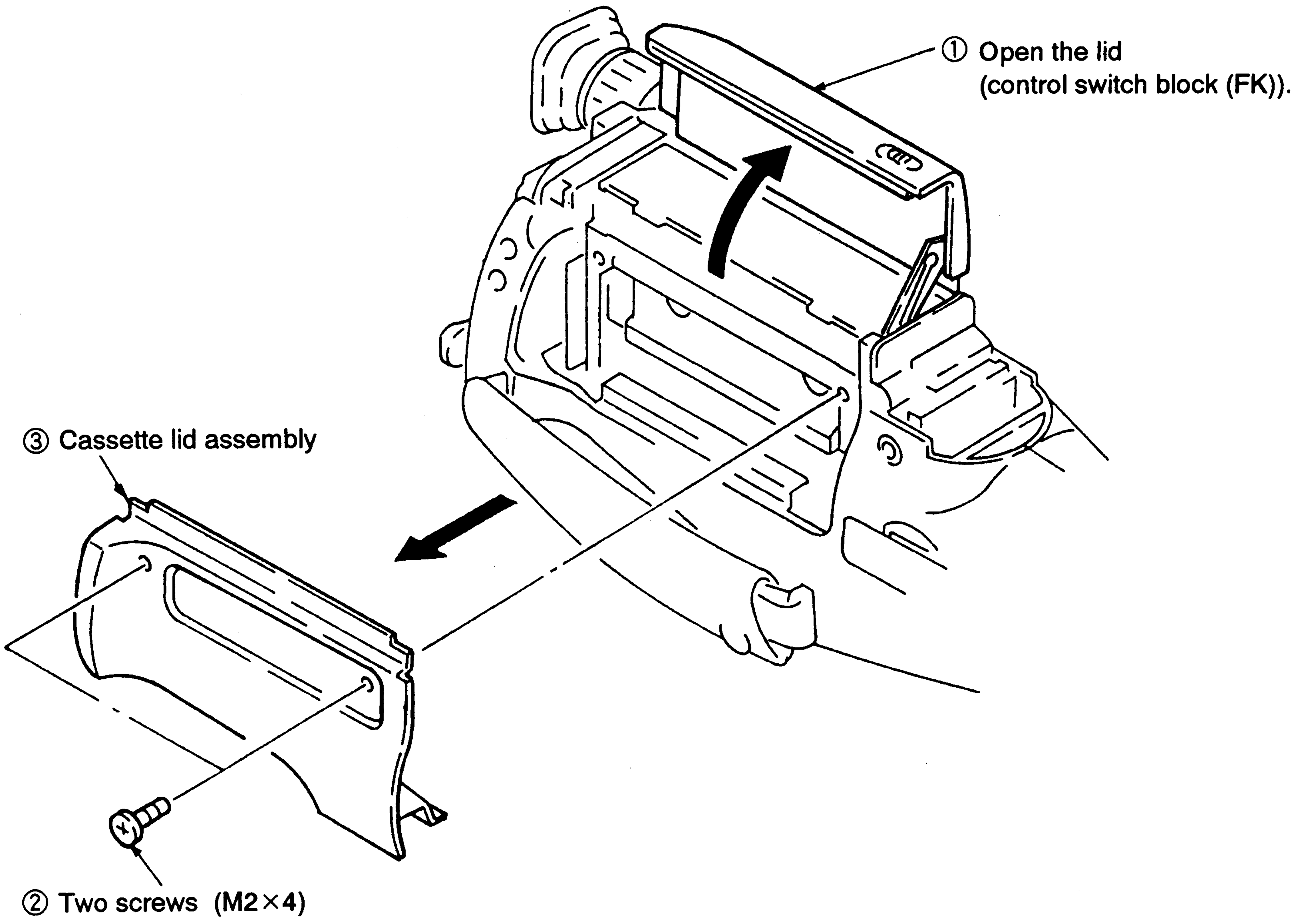

② Remove the microphone (SL) block in the arrow direction.
① Screw (M2×4)
③ Connector CN003 2P (MA-230 board)

2-2. REMOVAL OF FRONT CASE BLOCK


① Two screws (M2×4)
③ Front case block
② Screw (M2×4)
Power switch
Power button
Front case block

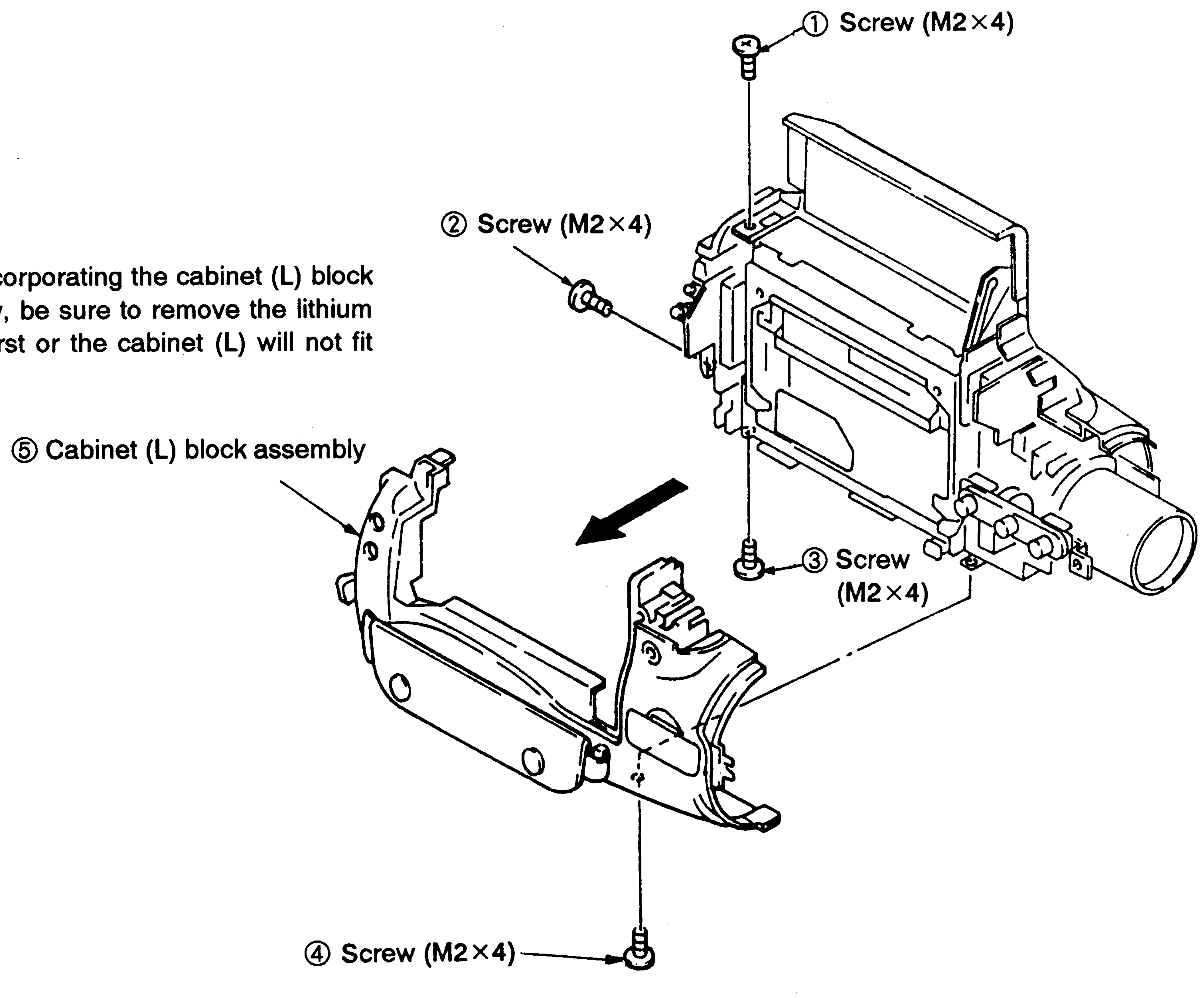
Note: To attach the front case block, move the power button and the power switch adjusting their positions to be in the center.

2-3. REMOVAL OF CASSETTE LID ASSEMBLY

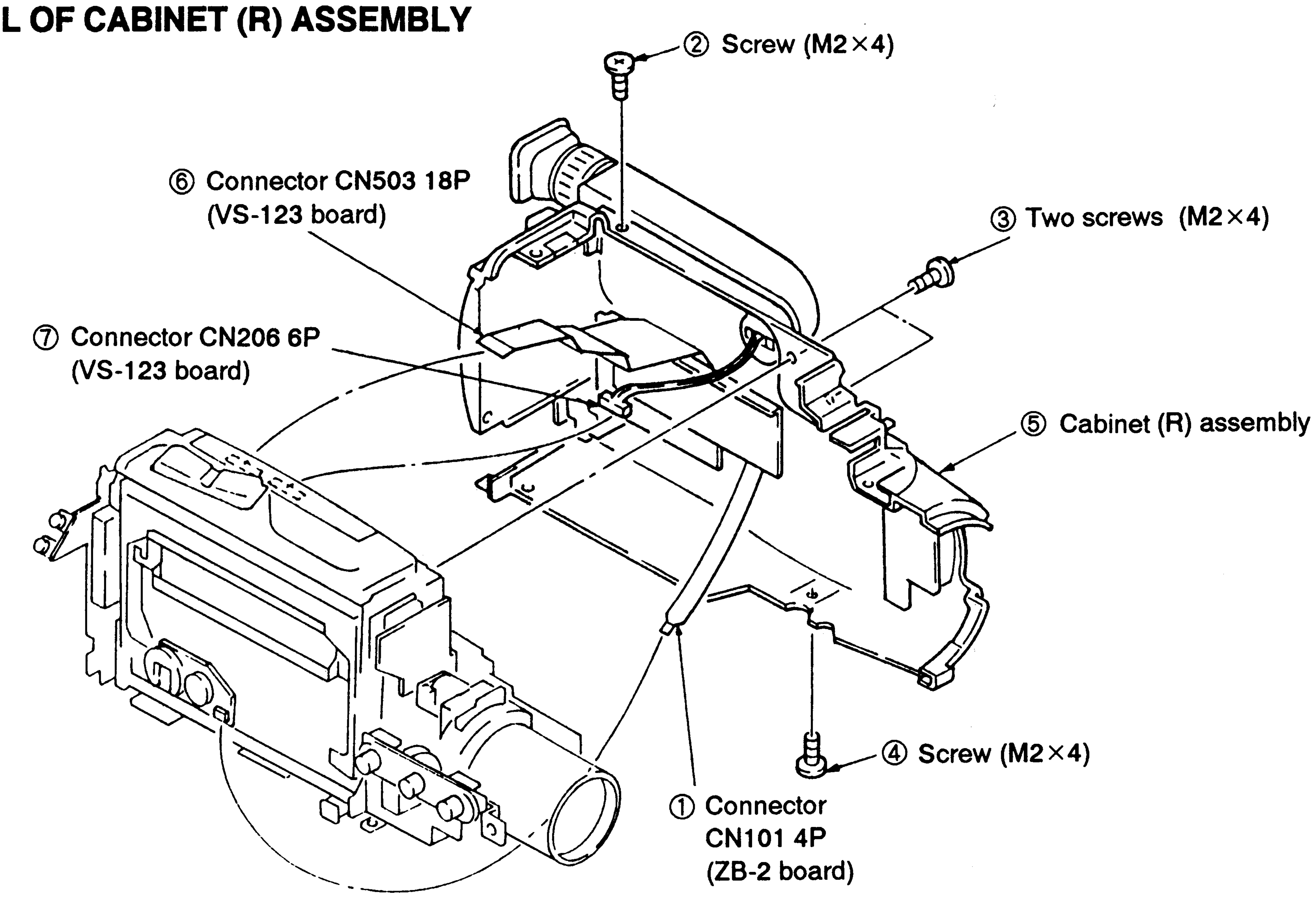

① Open the lid
(control switch block (FK)).
③ Cassette lid assembly
② Two screws (M2×4)

2-4. REMOVAL OF CABINET (L) BLOCK ASSEMBLY

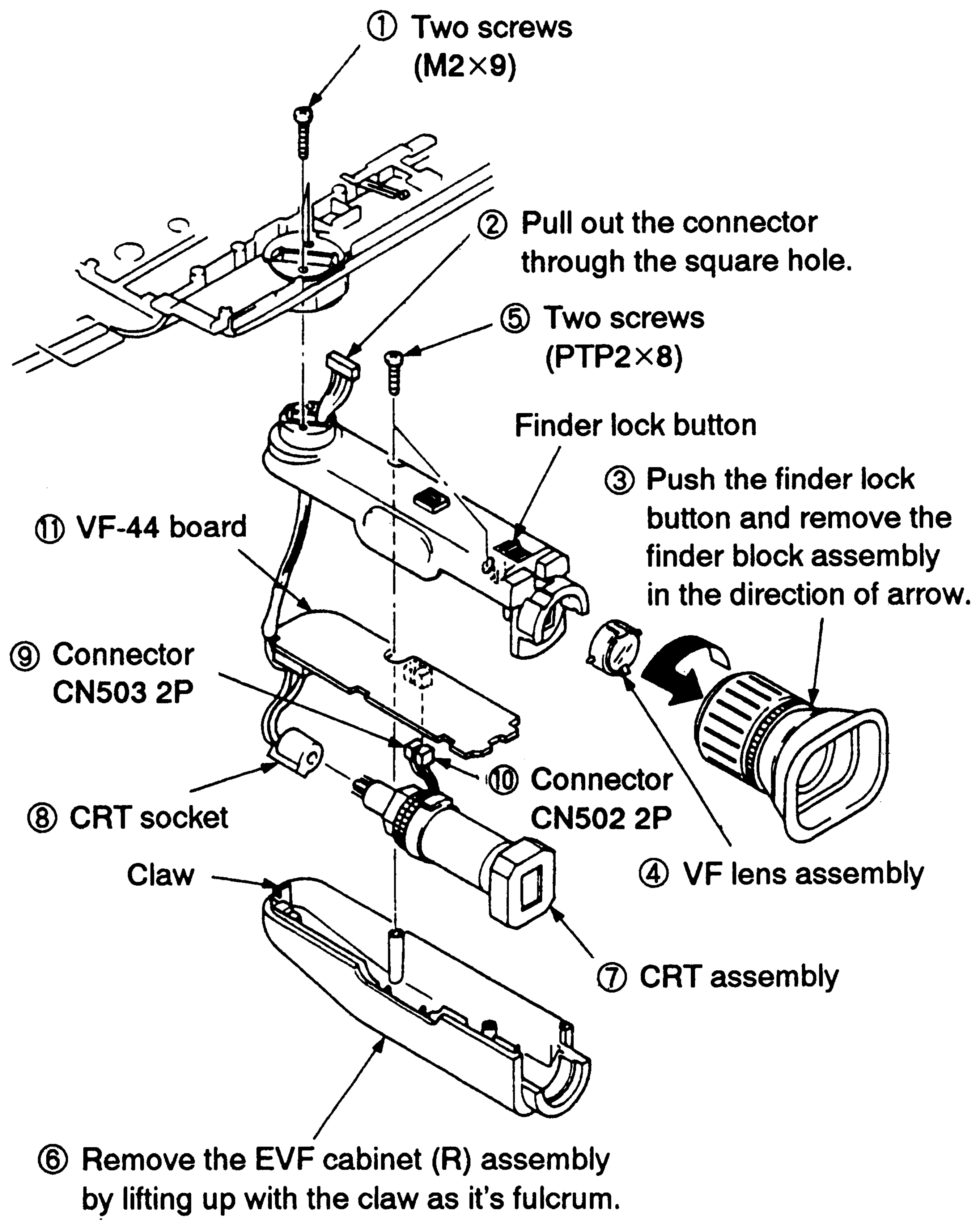
Note: When incorporating the cabinet (L) block assembly, be sure to remove the lithium battery first or the cabinet (L) will not fit properly.


① Screw (M2×4)
② Screw (M2×4)
⑤ Cabinet (L) block assembly
③ Screw
(M2×4)
④ Screw (M2×4)

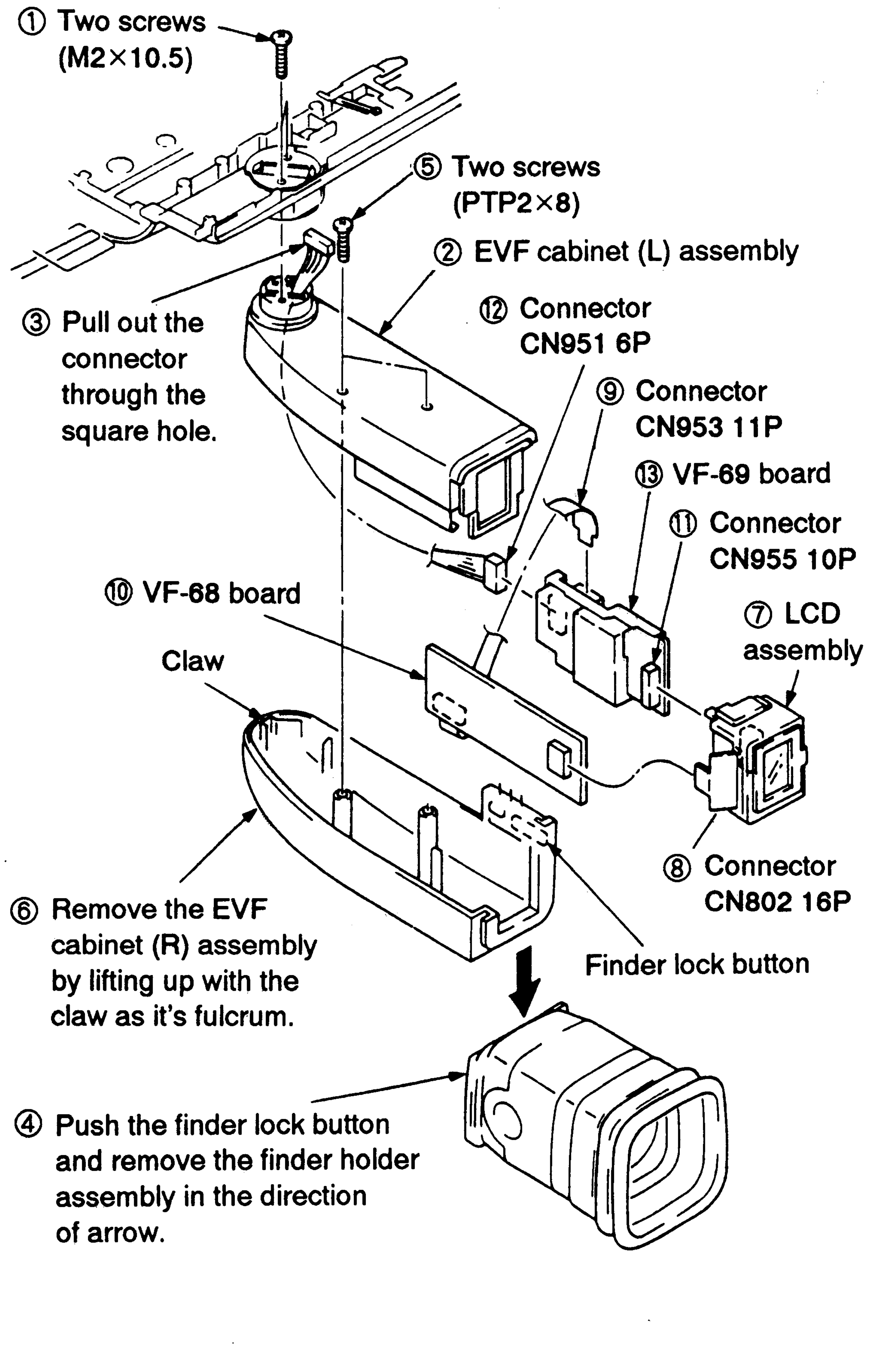
2-5. REMOVAL OF CABINET (R) ASSEMBLY


② Screw (M2×4)
⑥ Connector CN503 18P
(VS-123 board)
③ Two screws (M2×4)
⑦ Connector CN206 6P
(VS-123 board)
⑤ Cabinet (R) assembly
④ Screw (M2×4)
① Connector
CN101 4P
(ZB-2 board)

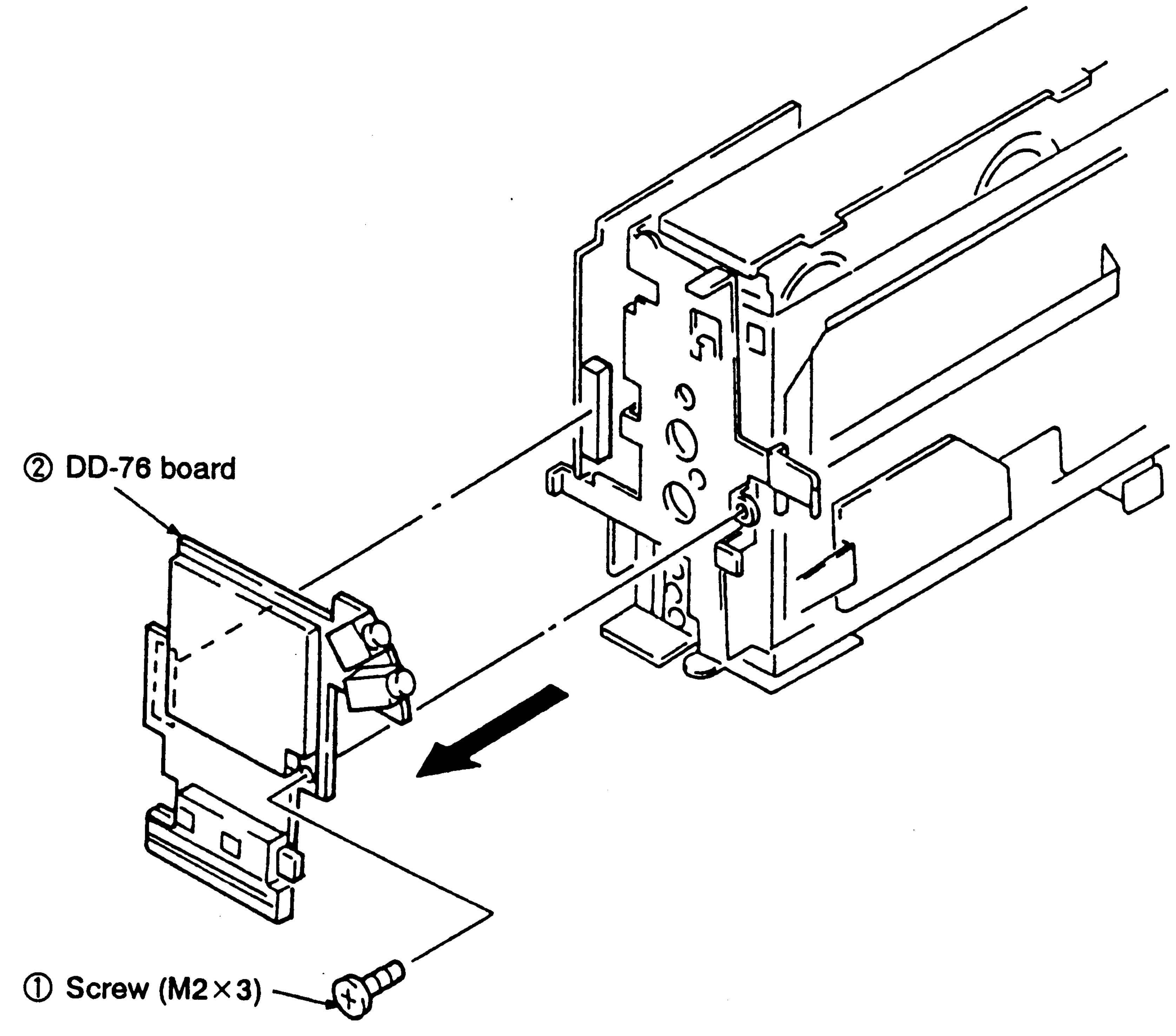
2-6. REMOVAL OF EVF ASSEMBLY (FX240) (VF-44 BOARD)


① Two screws
(M2×9)
② Pull out the connector
through the square hole.
⑤ Two screws
(PTP2×8)
Finder lock button
③ Push the finder lock
button and remove the
finder block assembly
in the direction of arrow.
⑪ VF-44 board
⑨ Connector
CN503 2P
⑩ Connector
CN502 2P
⑧ CRT socket
④ VF lens assembly
Claw
⑦ CRT assembly
⑥ Remove the EVF cabinet (R) assembly
by lifting up with the claw as it's fulcrum.

2-6. REMOVAL OF EVF ASSEMBLY (FX340) (VF-68/69 BOARD)

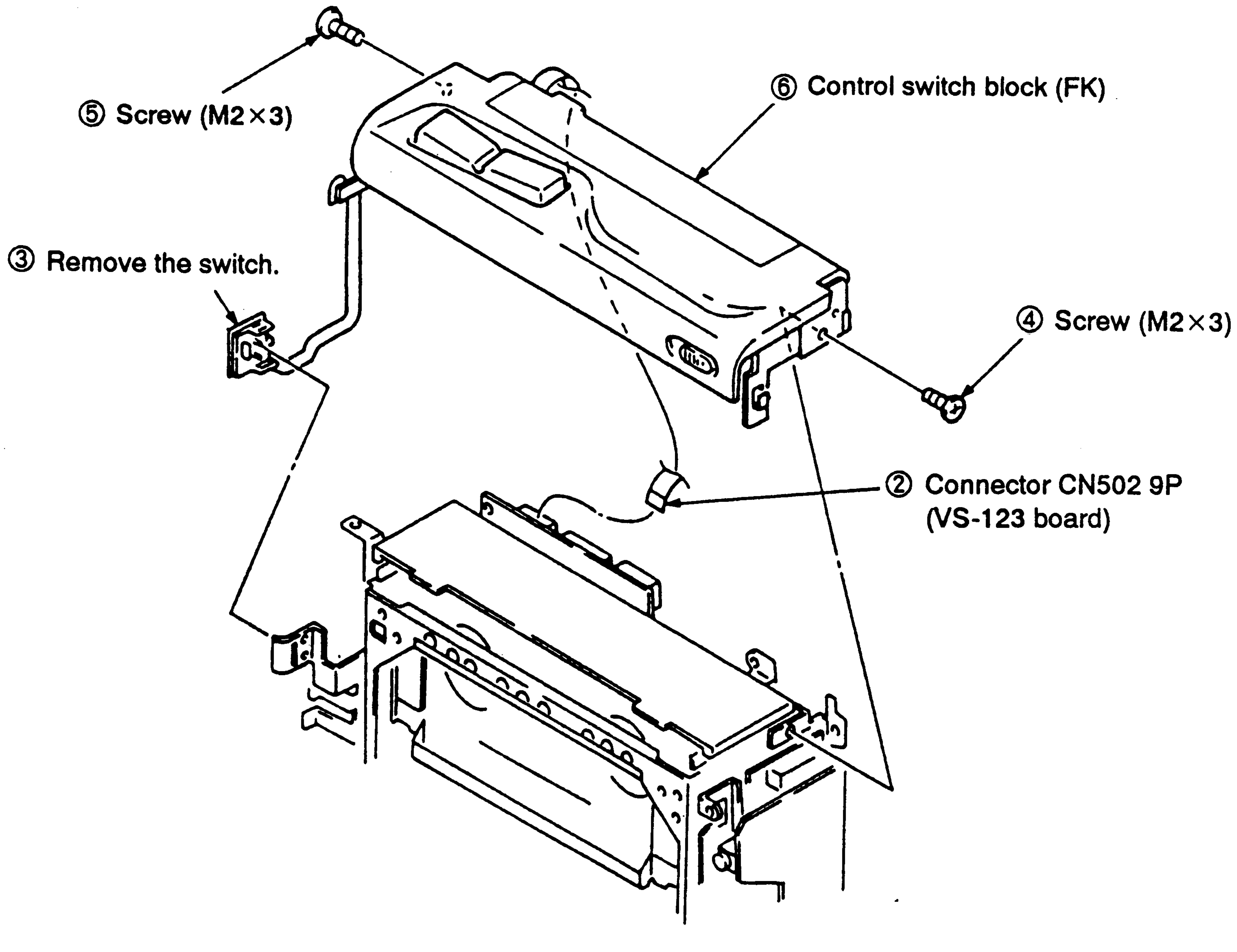

① Two screws
(M2×10.5)
⑤ Two screws
(PTP2×8)
② EVF cabinet (L) assembly
③ Pull out the
connector
through the
square hole.
⑫ Connector
CN951 6P
⑨ Connector
CN953 11P
⑬ VF-69 board
⑪ Connector
CN955 10P
⑩ VF-68 board
⑦ LCD
assembly
Claw
⑧ Connector
CN802 16P
⑥ Remove the EVF
cabinet (R) assembly
by lifting up with the
claw as it's fulcrum.
Finder lock button
④ Push the finder lock button
and remove the finder holder
assembly in the direction
of arrow.

2-7. REMOVAL OF DD-76 BOARD

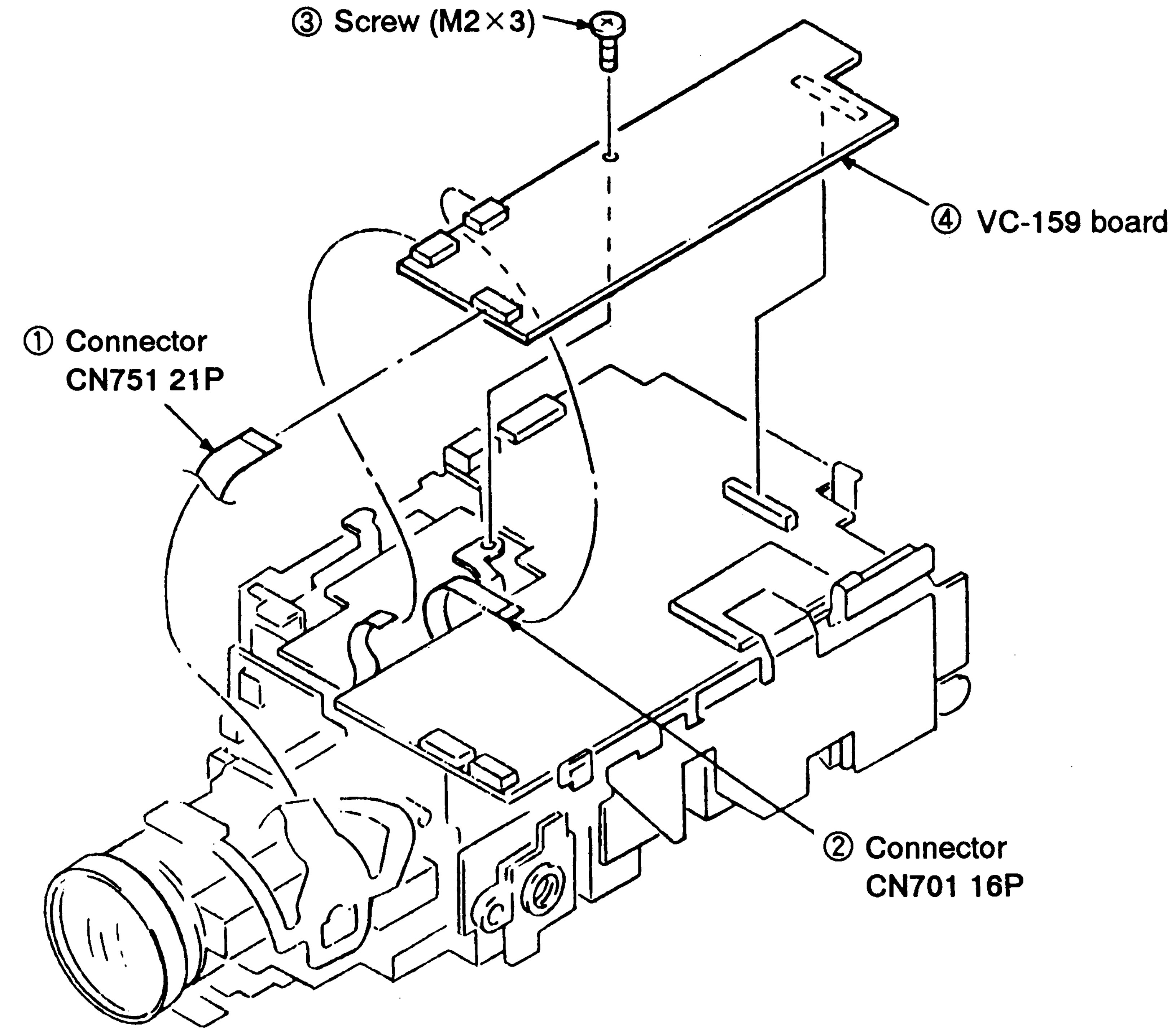

② DD-76 board
① Screw (M2×3)

2-8. REMOVAL OF CONTROL SWITCH BLOCK (FK)

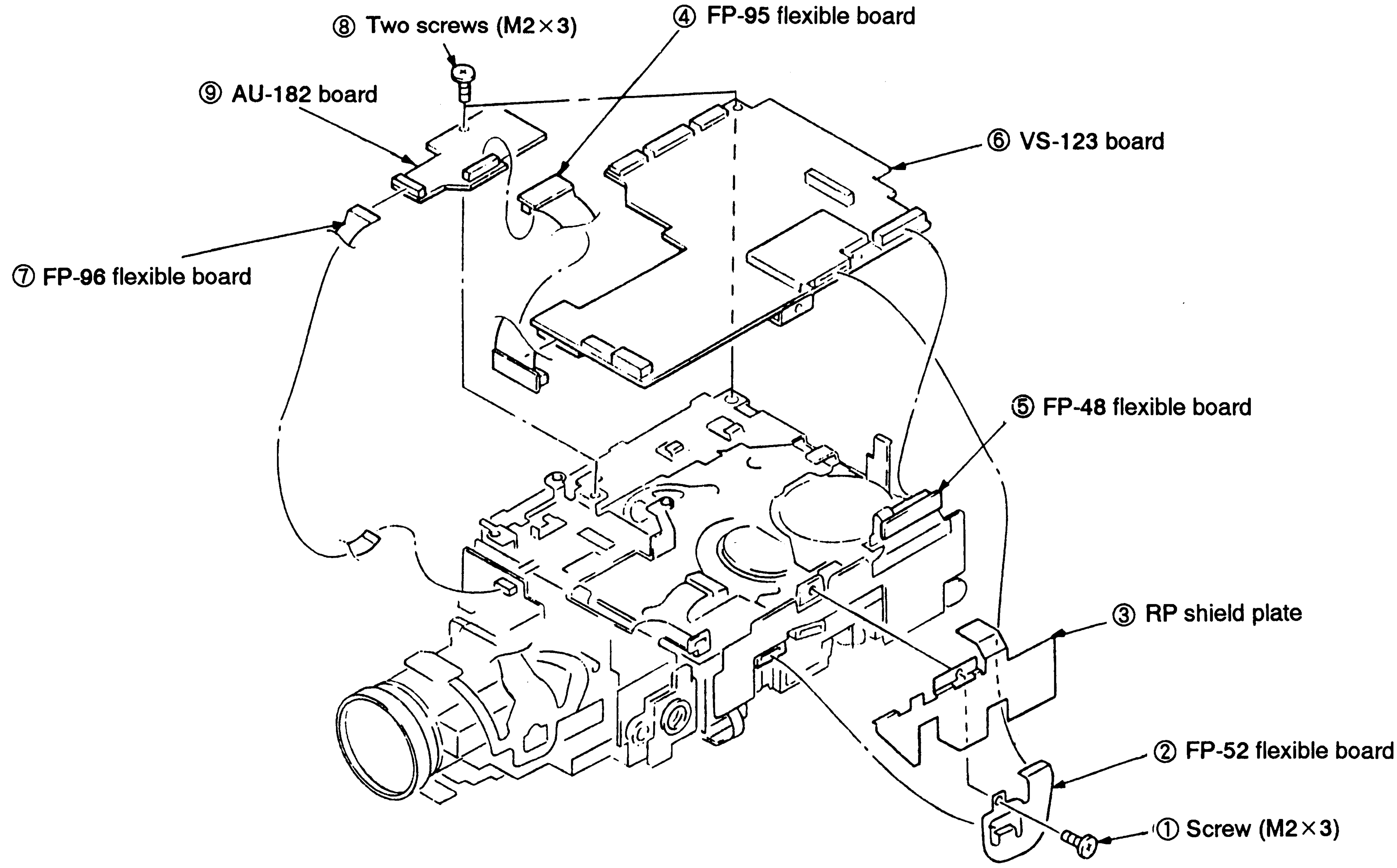
Note: ① Refer to 2-7 and remove the DD-76 board.


⑤ Screw (M2×3)
⑥ Control switch block (FK)
③ Remove the switch.
④ Screw (M2×3)
② Connector CN502 9P
(VS-123 board)

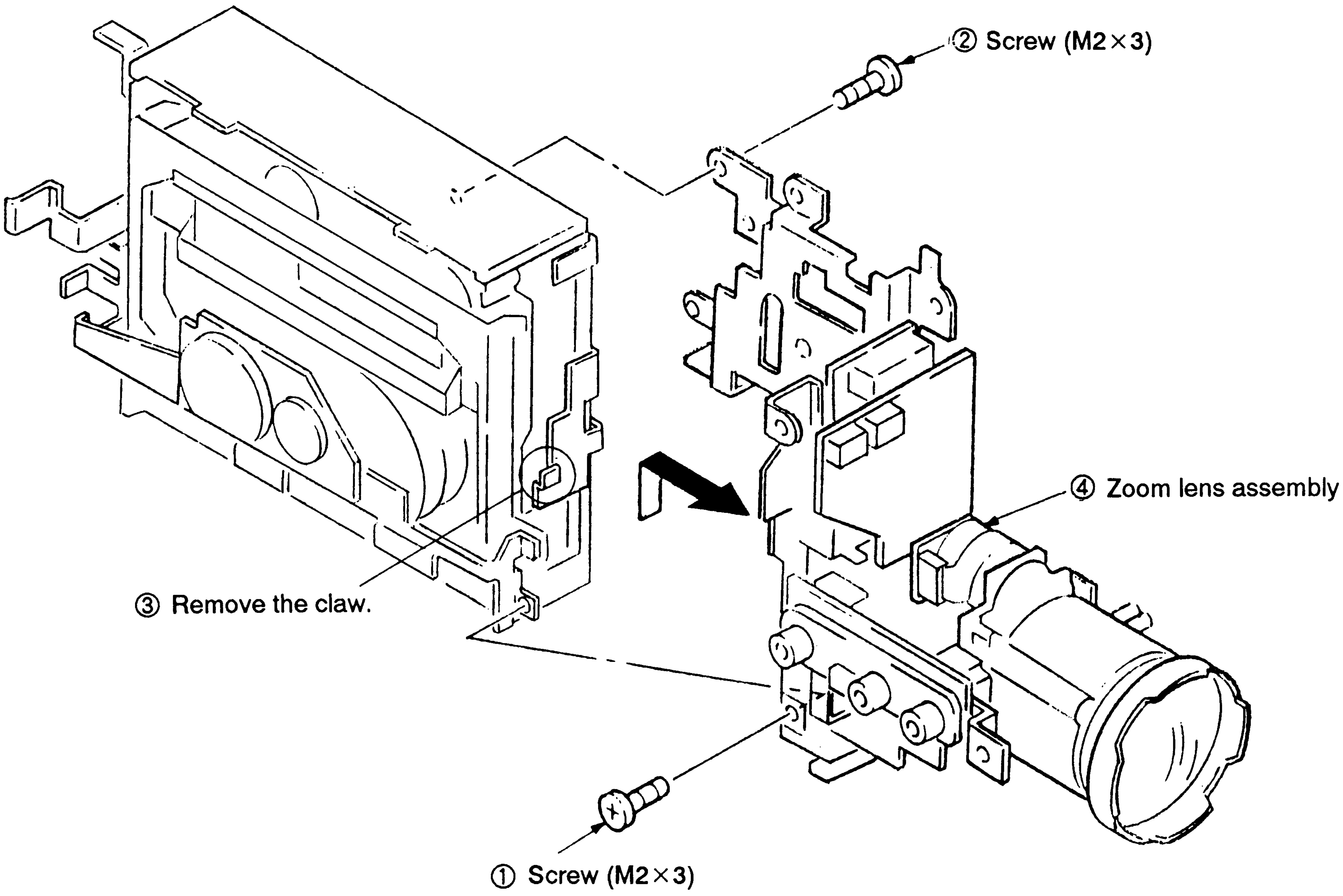
2-9. REMOVAL OF VC-159 BOARD


③ Screw (M2×3)
④ VC-159 board
① Connector
CN751 21P
② Connector
CN701 16P

2-10. REMOVAL OF VS-123 AND AU-182 BOARD

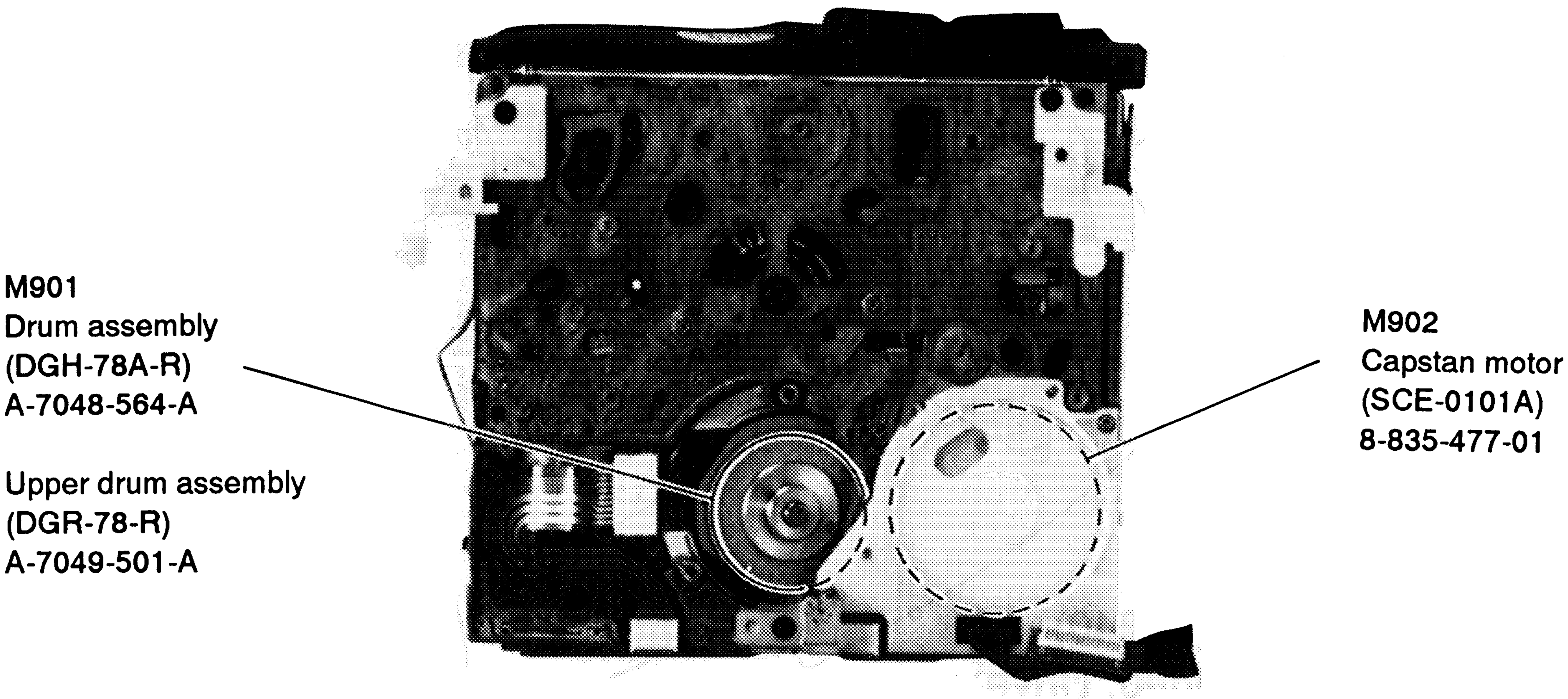

⑧ Two screws (M2×3)
④ FP-95 flexible board
⑨ AU-182 board
⑥ VS-123 board
⑦ FP-96 flexible board
⑤ FP-48 flexible board
③ RP shield plate
② FP-52 flexible board
① Screw (M2×3)

2-11. REMOVAL OF ZOOM LENS BLOCK ASSEMBLY

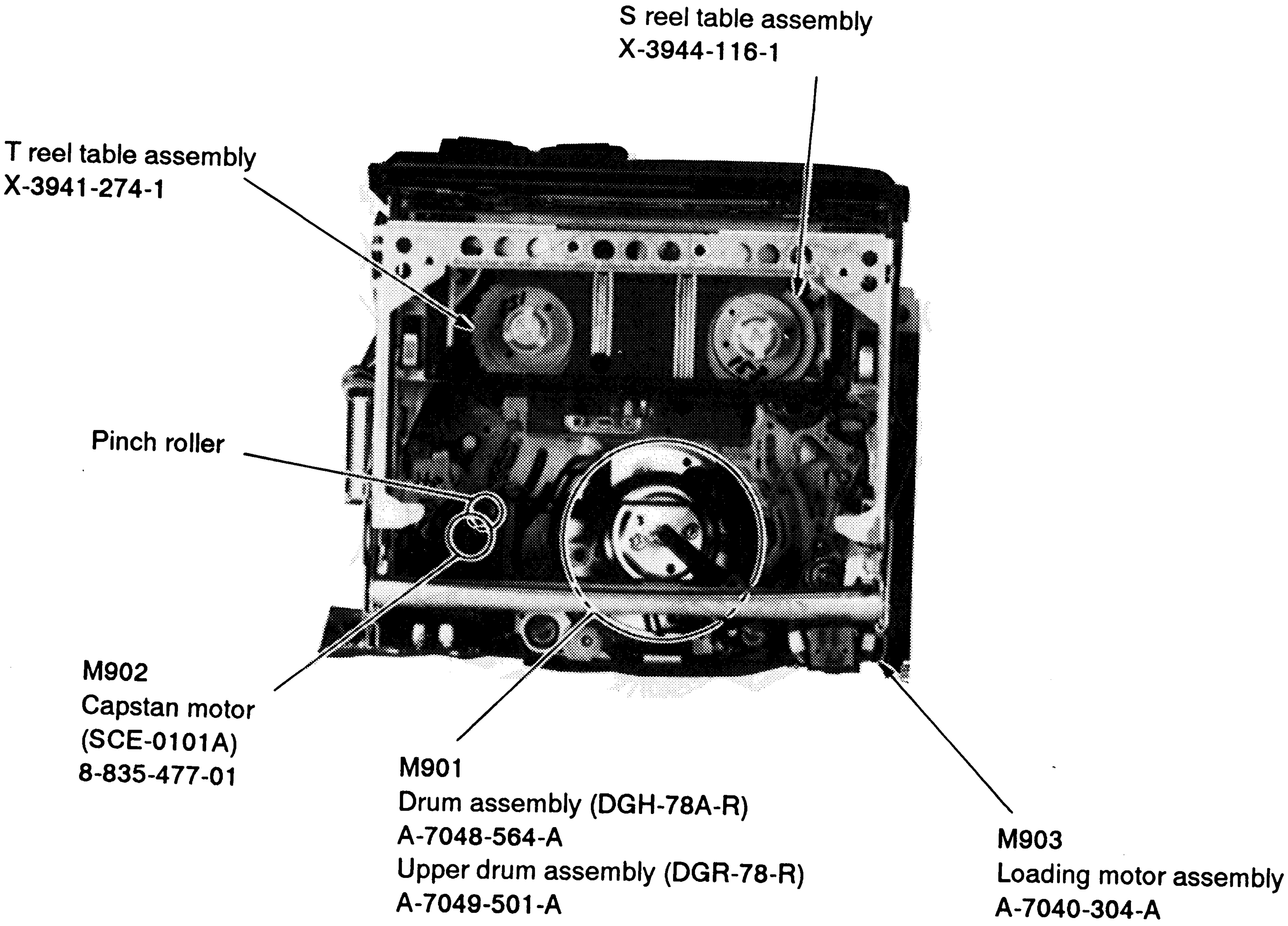

② Screw (M2×3)
④ Zoom lens assembly
③ Remove the claw.
① Screw (M2×3)

2-12. INTERNAL VIEWS

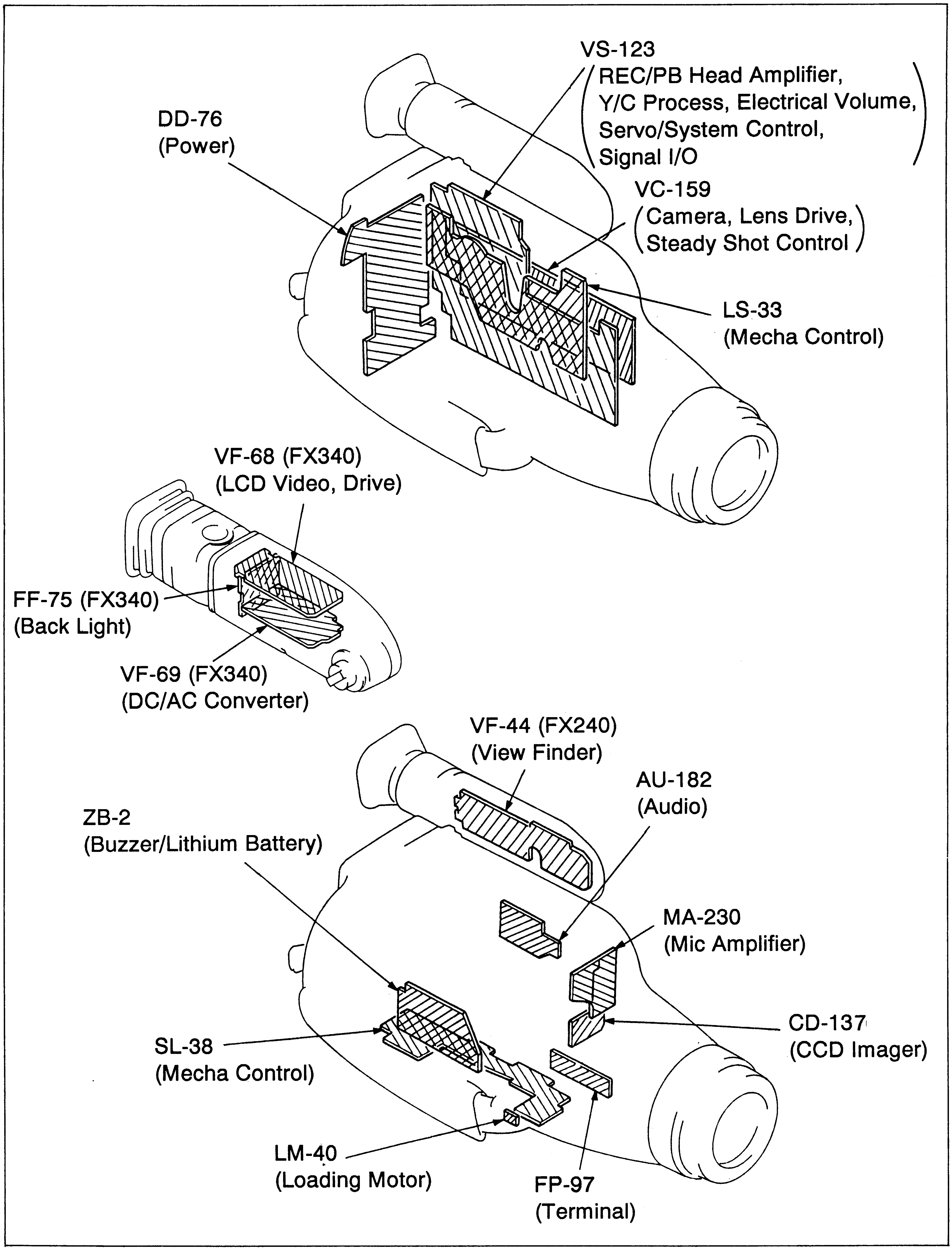
— Right side —


M901
Drum assembly
(DGH-78A-R)
A-7048-564-A
Upper drum assembly
(DGR-78-R)
A-7049-501-A
M902
Capstan motor
(SCE-0101A)
8-835-477-01

— Left side —


S reel table assembly
X-3944-116-1
T reel table assembly
X-3941-274-1
Pinch roller
M902
Capstan motor
(SCE-0101A)
8-835-477-01
M901
Drum assembly (DGH-78A-R)
A-7048-564-A
Upper drum assembly (DGR-78-R)
A-7049-501-A
M903
Loading motor assembly
A-7040-304-A

2-13. CIRCUIT BOARDS LOCATION


VS-123
(REC/PB Head Amplifier, Y/C Process, Electrical Volume, Servo/System Control, Signal I/O)
DD-76
(Power)
VC-159
(Camera, Lens Drive, Steady Shot Control)
LS-33
(Mecha Control)
VF-68 (FX340)
(LCD Video, Drive)
FF-75 (FX340)
(Back Light)
VF-69 (FX340)
(DC/AC Converter)
VF-44 (FX240)
(View Finder)
AU-182
(Audio)
ZB-2
(Buzzer/Lithium Battery)
MA-230
(Mic Amplifier)
CD-137
(CCD Imager)
SL-38
(Mecha Control)
LM-40
(Loading Motor)
FP-97
(Terminal)

SECTION 5

REPAIR PARTS LIST

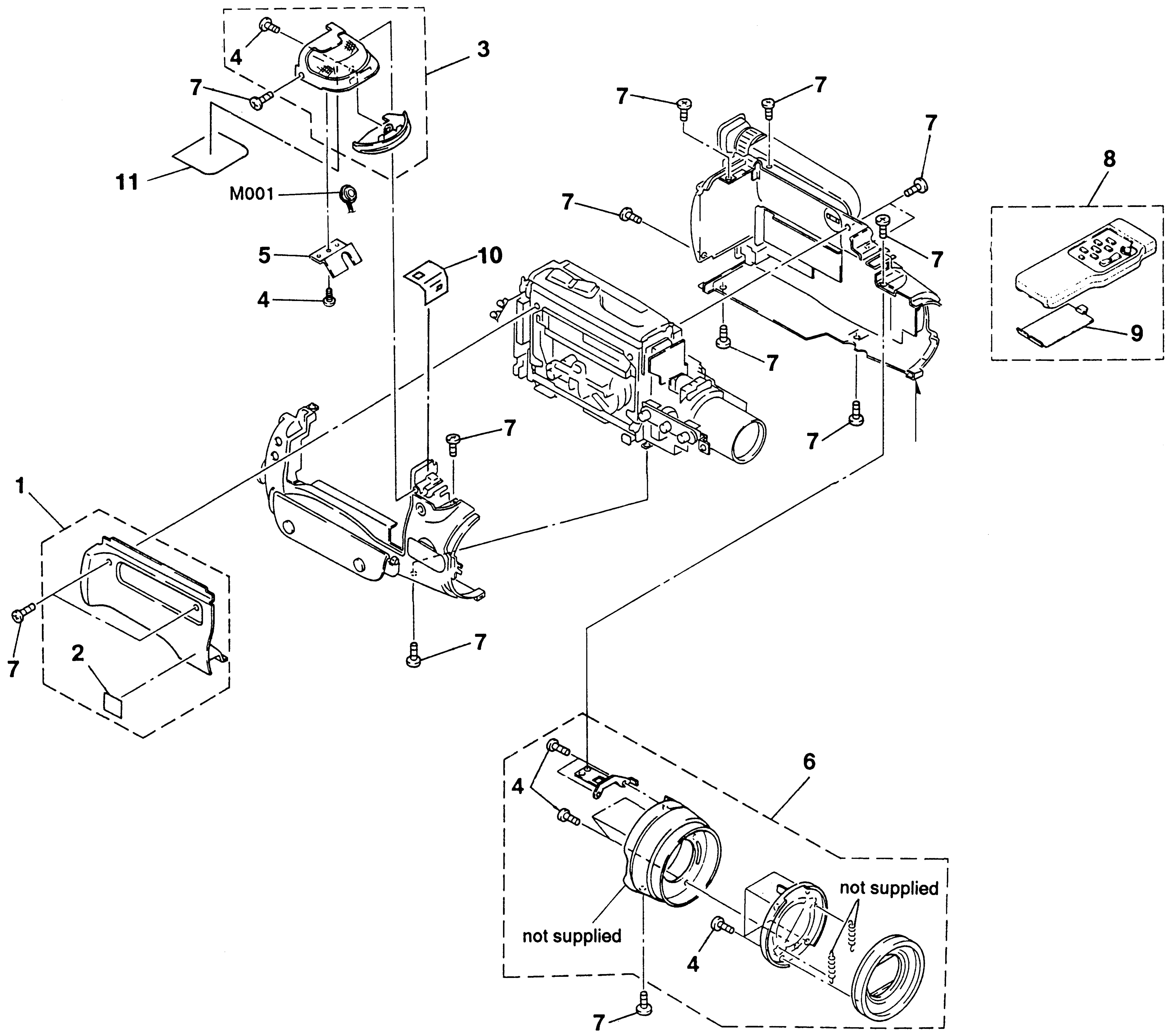
5-1. EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Hardware (# mark) list is given in the last of this parts list.

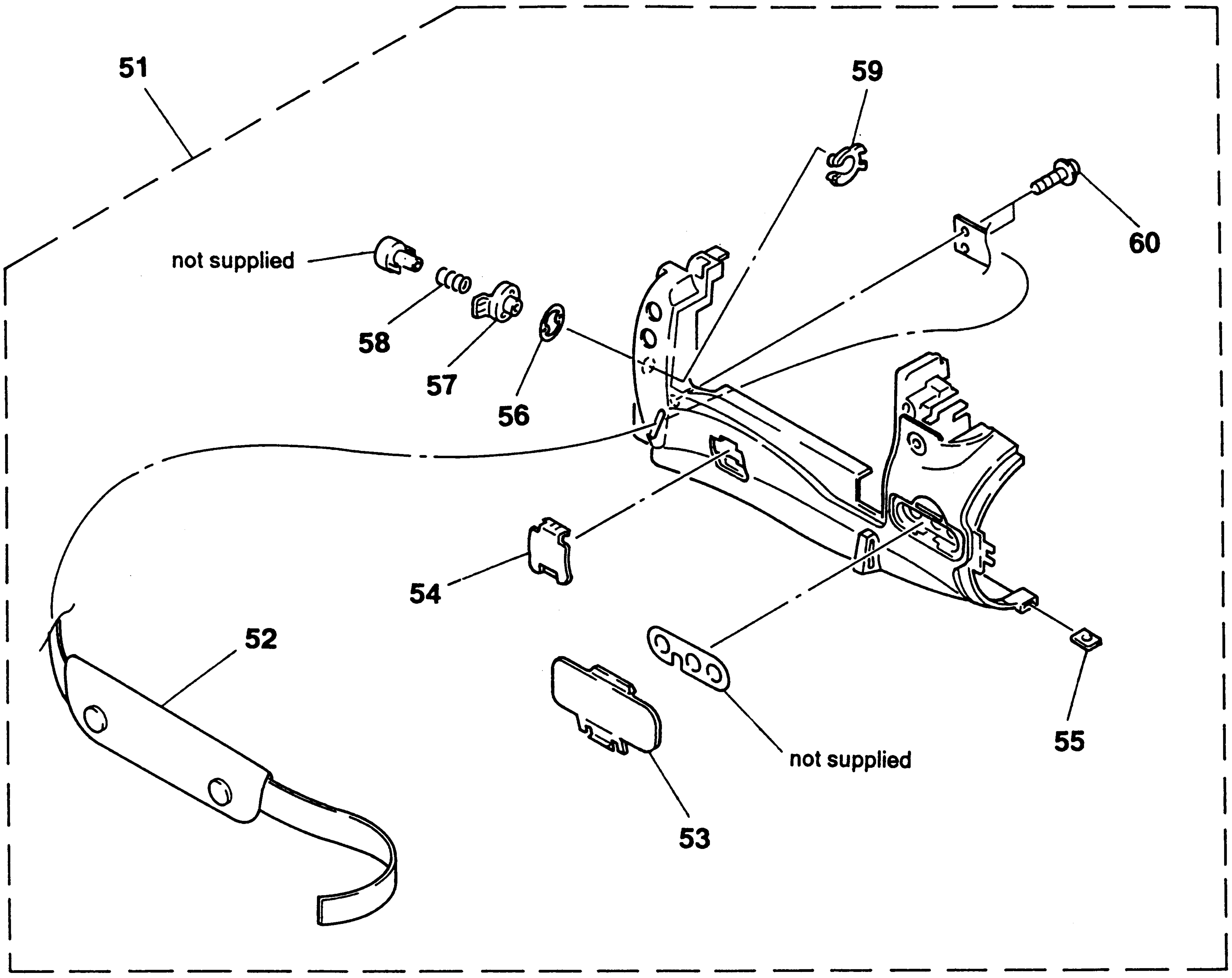
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-1. FRONT CASE BLOCK ASSEMBLY



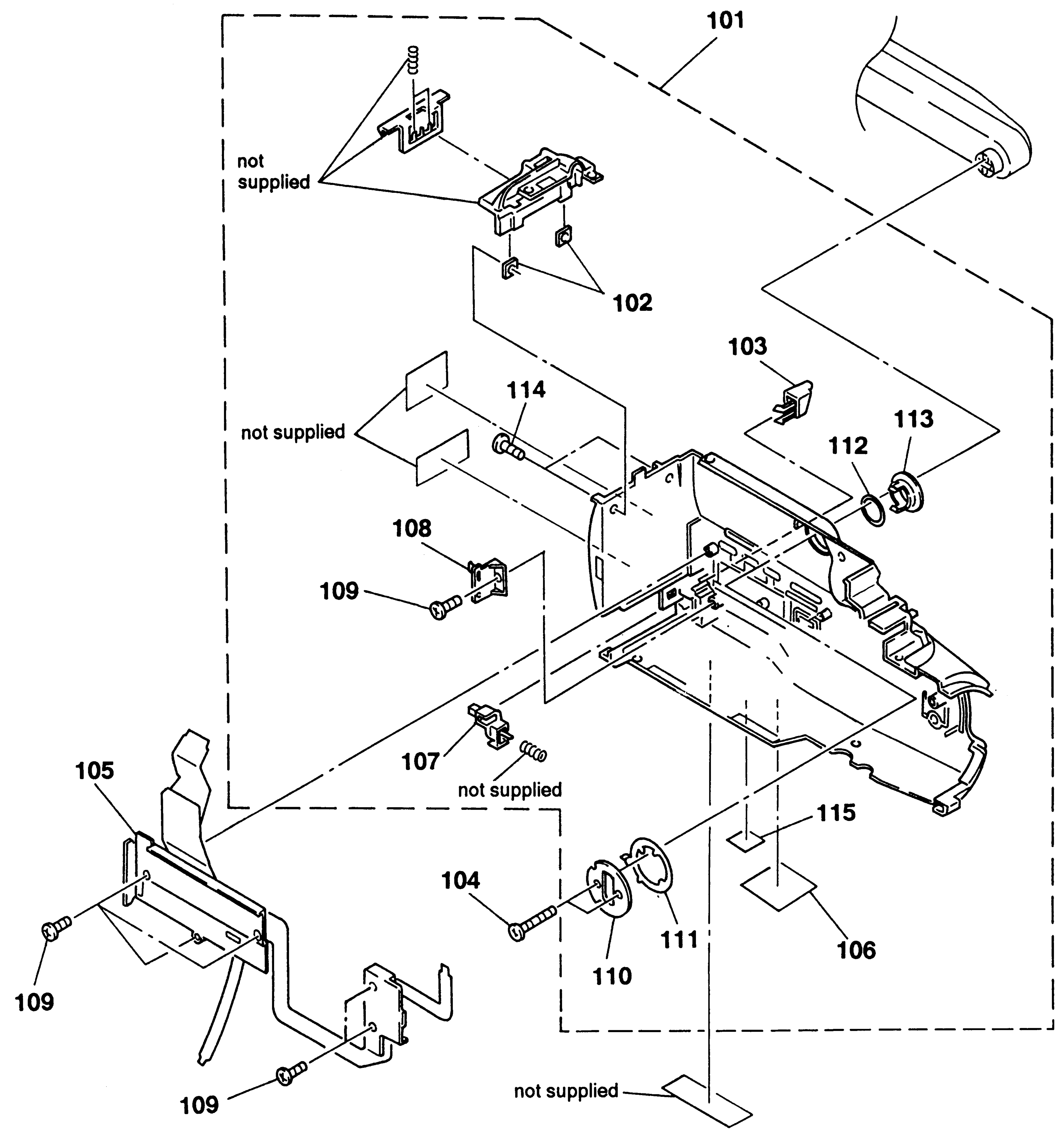
Ref. No.	Part No.	Description	Remark
1	X-3944-867-1	LID ASSY, CASSETTE	
2	3-703-710-41	STICKER, SONY SYMBOL (12)	
3	X-3944-866-1	HOLDER (M) ASSY, MICROPHONE	
4	3-948-339-01	SCREW, TAPPING	
* 5	3-958-672-01	PLATE, FIXED (W), MICROPHONE	
6	A-7082-608-A	CASE (L) BLOCK ASSY, FRONT	
7	3-719-381-01	SCREW (M2X4)	
8	1-467-574-21	REMOTE COMMANDER (RMT-708)	
9	3-958-131-01	LID, BATTERY CASE (for RMT-708)	
10	3-964-036-01	CUSHION (I), MN	
11	3-963-089-01	CUSHION (I), HOLDER	
M001	1-542-162-11	MICROPHONE, CAP	

5-1-2. CABINET (L) BLOCK ASSEMBLY


51
59
60
not supplied
58
57
56
54
52
not supplied
55
53

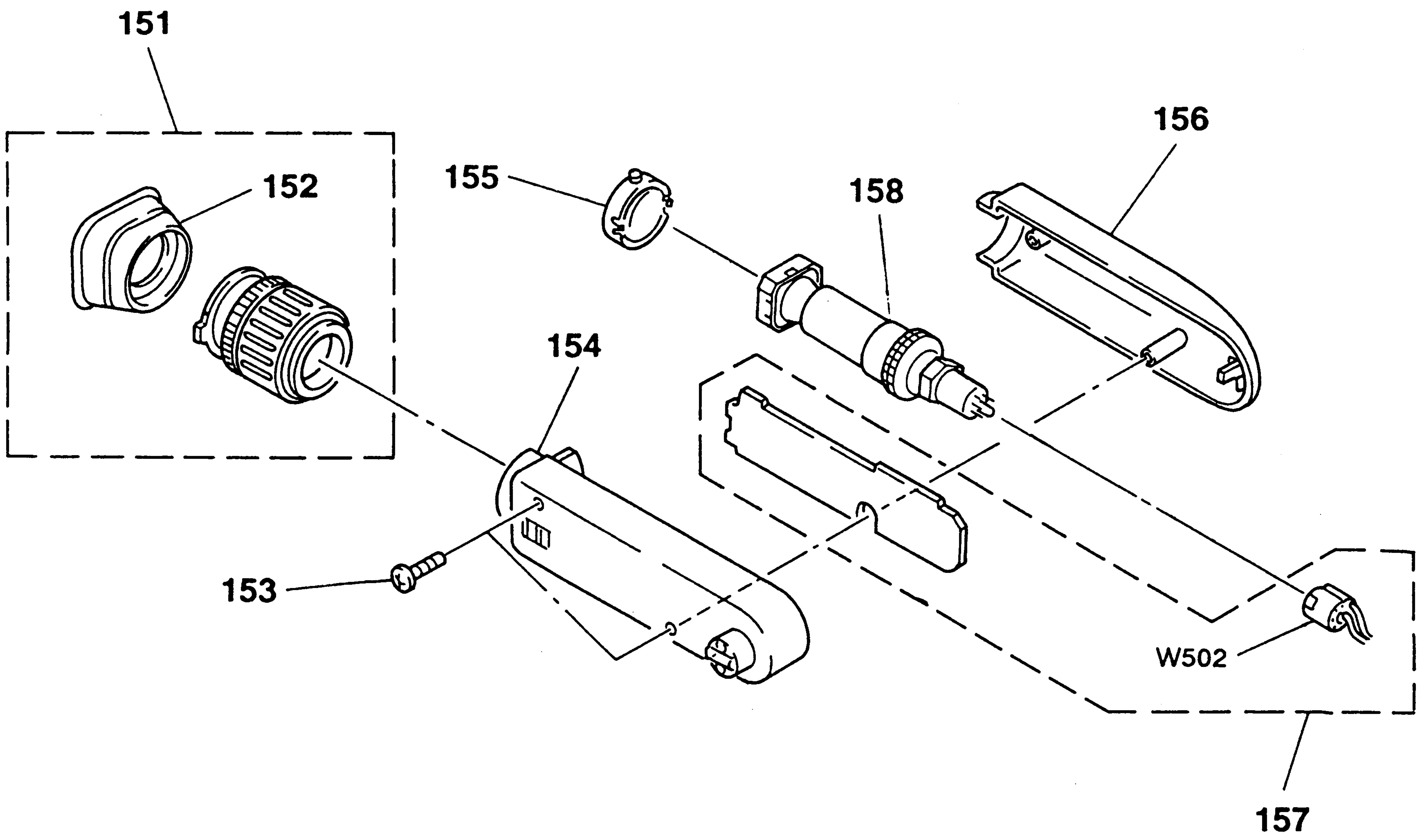
Ref. No.	Part No.	Description	Remark
51	A-7082-803-A	CABINET (L) BLOCK ASSY (L)	
52	3-960-626-01	BELT, GRIP	
53	3-958-335-01	COVER, JACK	
54	3-958-334-01	LID, BATTERY CASE, LITHIUM	
55	3-718-233-01	NUT, PLATE	
56	3-736-364-01	SPRING	
57	3-942-985-01	KNOB, STAND-BY	
58	3-578-221-00	SPRING, COMPRESSION	
59	3-942-953-01	HOLDER, STAND-BY KNOB	
60	3-669-480-21	+ PTPWH 2	

5-1-3. CABINET (R) BLOCK ASSEMBLY


101
not supplied
102
103
114
113
112
not supplied
108
109
105
107
not supplied
115
104
111
106
110
109
109
not supplied

Ref. No.	Part No.	Description	Remark
101	X-3944-865-1	CABINET (R) ASSY (FX340)	
101	X-3944-884-1	CABINET (R) ASSY (FX240)	
102	3-718-233-01	NUT, PLATE	
103	3-958-320-01	BUTTON, BATTERY RELEASE	
104	3-740-546-51	SCREW (M2X9)(FX240)	
104	3-740-546-61	SCREW (M2X10.5)(FX340)	
105	1-467-648-21	SWITCH BLOCK, CONTROL (CK)	
106	3-957-897-01	LABEL, FAROUDJA RECYCLE FCC	
107	3-958-321-01	CLAW (LOWER), BATTERY LOCK	
108	3-958-322-01	HOLDER, BATTERY LOCK	
109	3-948-339-01	SCREW, TAPPING	
* 110	3-958-297-01	PLATE, LOCK, TILT	
* 111	3-958-296-01	SPRING, PLATE, TILT	
112	3-747-112-01	RING, TILT	
113	3-747-109-01	SLEEVE, EVF	
114	3-719-381-01	SCREW (M2X4)	
115	3-704-256-01	LABEL, CAUTION	

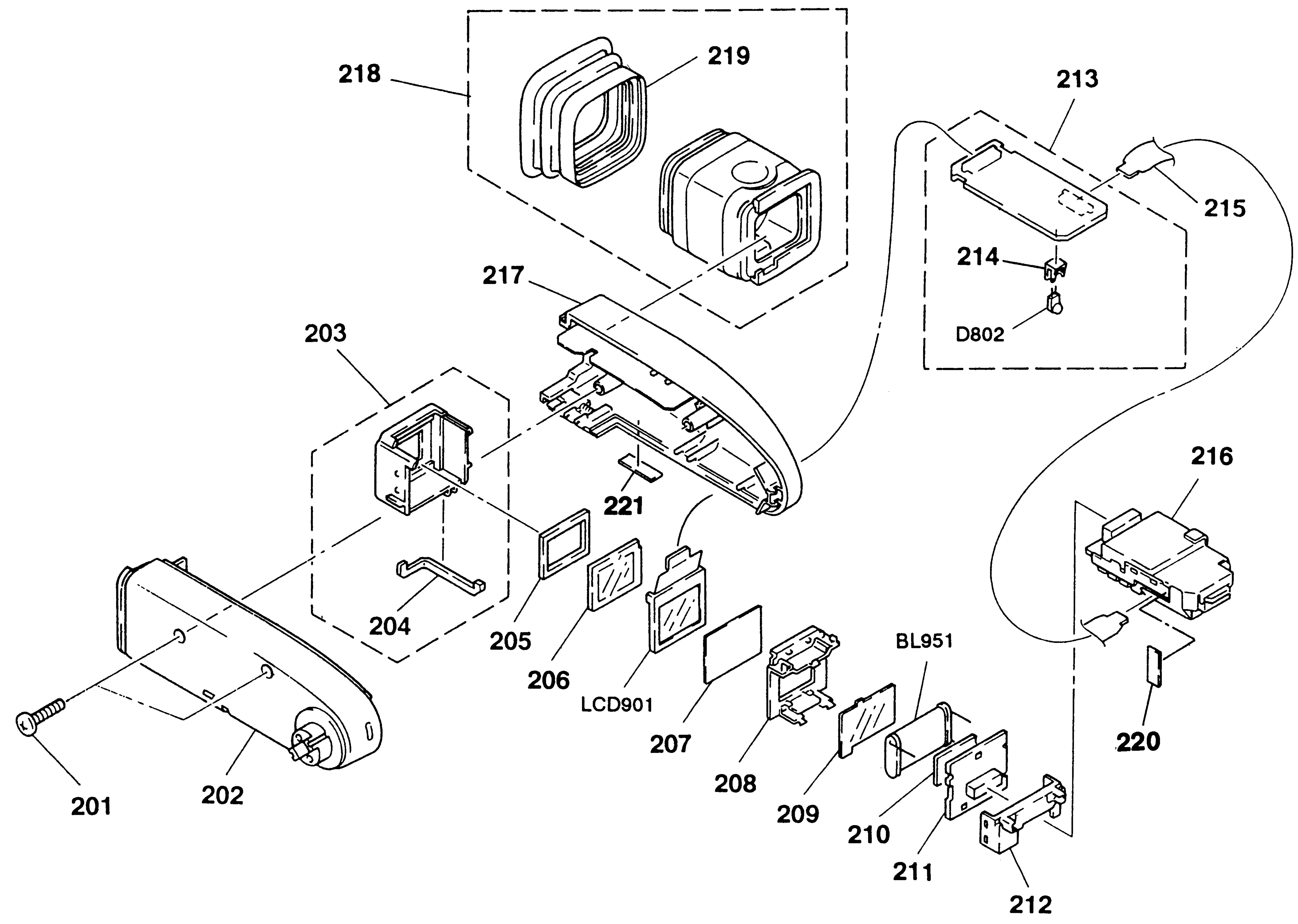
5-1-4. EVF BLOCK ASSEMBLY (FX240)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

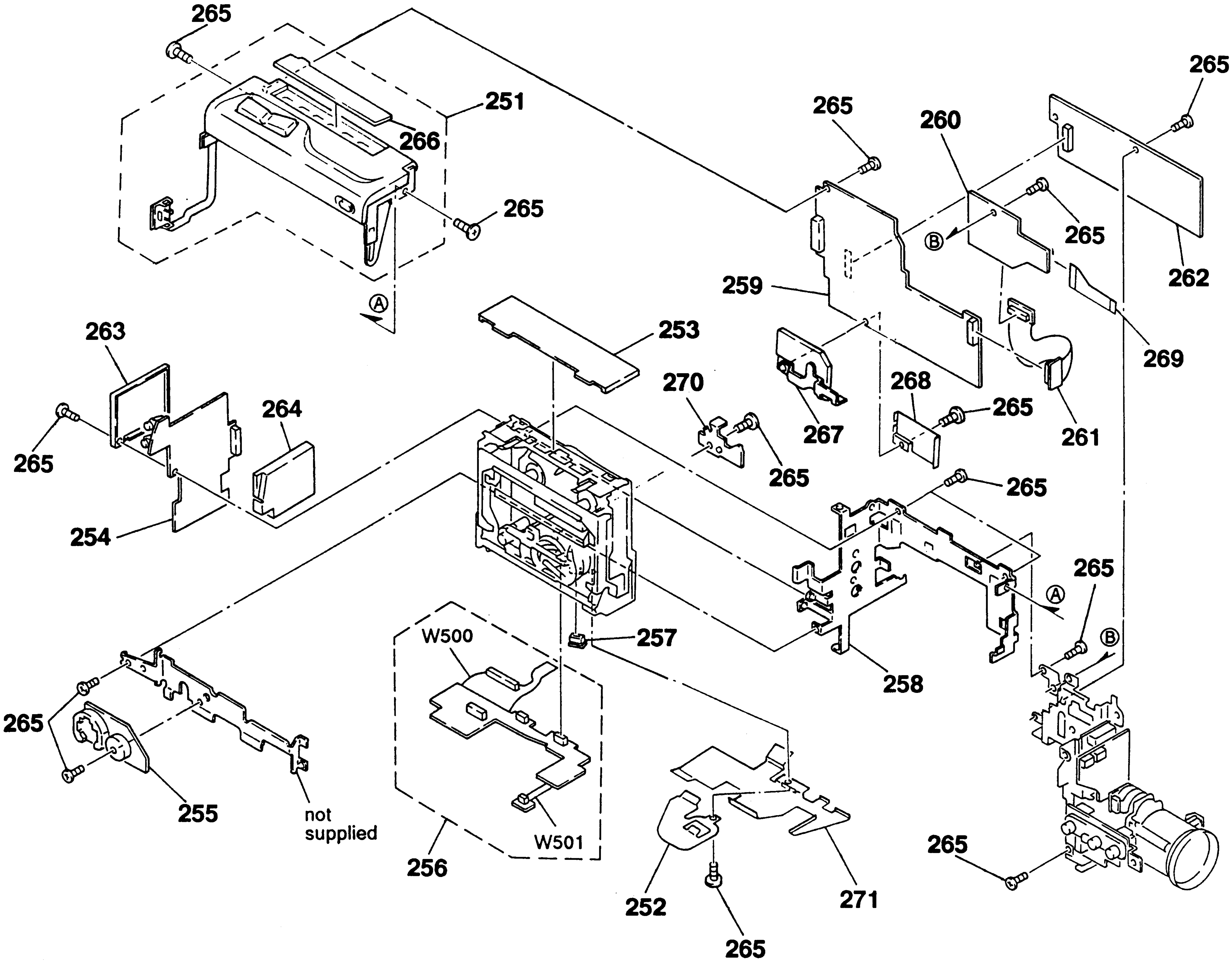
Ref. No.	Part No.	Description	Remark
151	A-7081-897-C	HOLDER BLOCK ASSY, FINDER	
152	3-946-212-01	EYE CUP	
153	3-713-790-31	SCREW (M2X8), TAPPING, P3	
154	X-3943-848-1	CABINET(L)ASSY, EVF	
155	A-7081-905-E	LENS ASSY, VF	
156	X-3943-844-1	CABINET(R)ASSY, EVF	
* 157	A-7063-947-A	VF-44 BOARD, COMPLETE	
⚠158	1-452-566-11	CRT ASSY (M01KKX07WB10)	
W502	1-526-978-51	SOCKET ASSY, CRT	

5-1-5. COLOR EVF BLOCK ASSEMBLY (FX340)


218
219
213
215
214
D802
217
203
216
221
204
205
206
LCD901
207
BL951
208
220
209
210
211
212
201
202

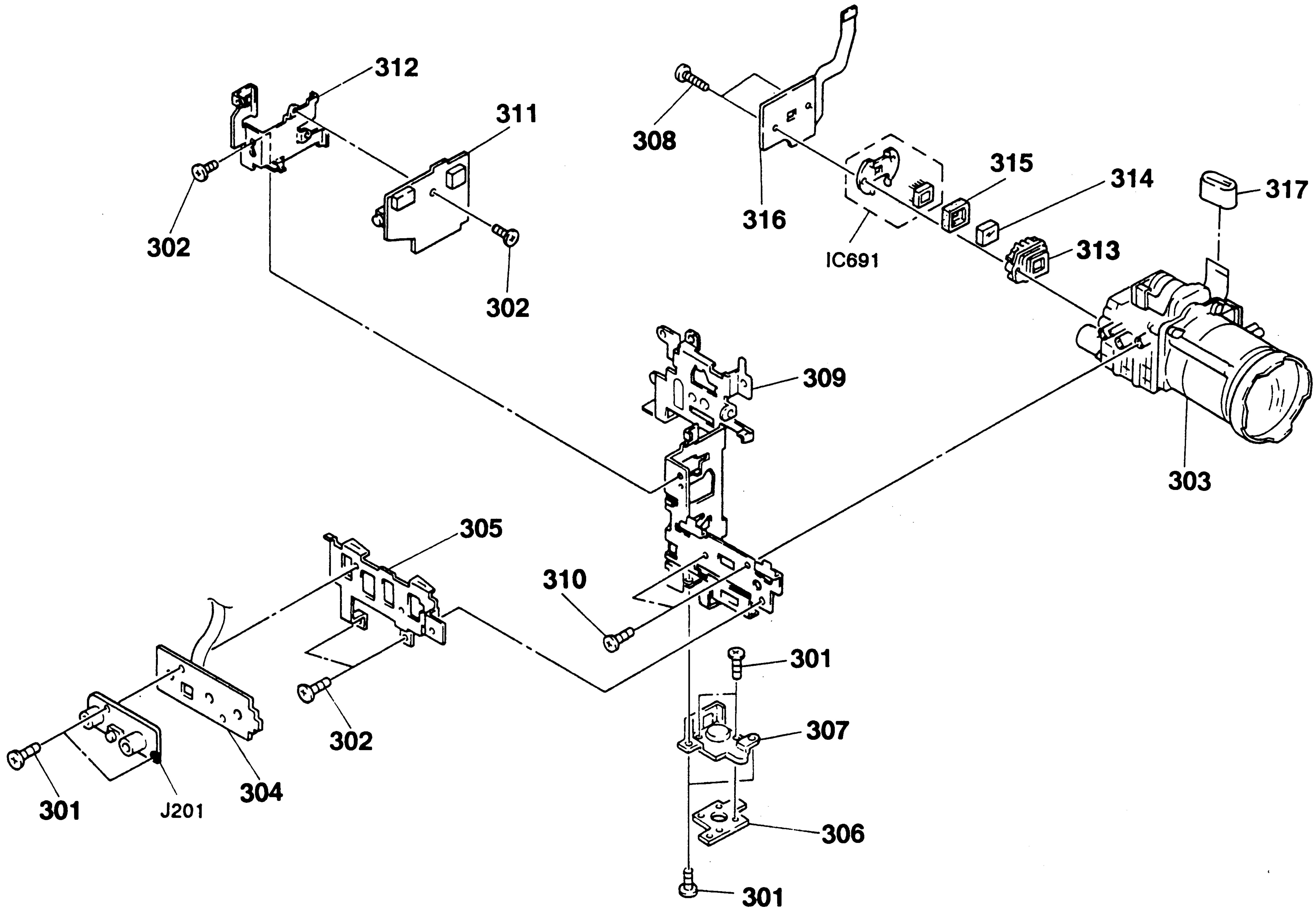
Ref. No.	Part No.	Description	Remark
201	3-713-790-31	SCREW (M2X8), TAPPING, P3	
202	X-3943-366-1	CABINET (L) ASSY, EVF	
203	X-3943-368-1	HOLDER ASSY, LCD	
* 204	3-947-711-01	GUIDE, LIGHT, INNER TALLY	
* 205	3-955-339-11	SPACER, LCD	
* 206	3-955-340-01	FILTER, LCD	
207	3-958-280-01	ILLUMINATOR, BL	
208	X-3943-227-1	HOLDER ASSY, BL	
* 209	3-955-570-01	PLATE, CONDENSE, BL	
* 210	3-955-573-01	SPACER (E), BL	
* 211	A-7071-913-A	FF-75 BOARD, COMPLETE	
212	3-947-714-11	HOLDER (R), LCD	
* 213	A-7063-779-A	VF-68 BOARD, COMPLETE	
214	3-942-888-01	HOLDER, LED	
215	1-643-806-11	FP-539 FLEXIBLE BOARD	
* 216	A-7063-780-A	VF-69 BOARD, COMPLETE	
217	X-3943-367-1	CABINET (R) ASSY, EVF	
218	X-3943-369-1	HOLDER ASSY, FINDER	
219	3-948-162-01	EYE CUP	
220	3-831-441-XX	SPACER, KNOB	
221	3-948-291-01	LABEL (3), EVF	
BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH)	
D802	8-719-984-02	LED BR4371F (TALLY)	
LCD901	8-753-011-00	LCX003BK-1	

5-1-6. MAIN BOARDS ASSEMBLY


265
251
266
265
Ⓐ
263
264
265
254
253
270
265
267
268
265
261
265
260
262
265
259
269
265
258
Ⓐ
265
Ⓑ
Ⓑ
257
W500
W501
256
265
255
not supplied
252
271
265
265

Ref. No.	Part No.	Description	Remark
251	1-467-649-11	SWITCH BLOCK, CONTROL (FK)(FX340)	
251	1-467-649-81	SWITCH BLOCK, CONTROL (FK)(FX240)	
252	1-651-891-11	FP-52 FLEXIBLE BOARD	
253	3-958-341-01	COVER, LS	
* 254	A-7066-308-A	DD-76 (SL) BOARD, COMPLETE	
* 255	A-7072-173-A	ZB-2 (SL) BOARD, COMPLETE	
* 256	A-7072-174-A	SL-38 (SL) BOARD, COMPLETE	
257	1-691-471-11	CONNECTOR, TRANSLATION 11P	
* 258	3-958-345-01	FRAME (U)	
* 259	A-7066-318-A	VS-123 (SLC) BOARD, COMPLETE (FX340)	
* 259	A-7066-310-A	VS-123 (SL) BOARD, COMPLETE (FX240)	
* 260	A-7066-307-A	AU-182 BOARD, COMPLETE	
261	1-651-935-11	FP-95 FLEXIBLE BOARD	
* 262	A-7066-309-A	VC-159 (SL) BOARD, COMPLETE	
* 263	3-958-925-01	CASE (MAIN), SHIELD, DD	
* 264	X-3944-169-1	SHIELD (LID) ASSY, DD	
265	3-713-786-21	SCREW (M2X3)	
266	3-958-720-01	LID	
* 267	X-3943-976-1	SHIELD (MAIN) ASSY, RP	
* 268	3-958-924-01	CASE (LID), SHIELD, RP	
269	1-651-936-11	FP-96 FLEXIBLE BOARD	
* 270	3-958-667-01	FRAME (B)	
* 271	3-958-928-01	PLATE, SHIELD, RP	
W500	1-651-889-11	FP-48 FLEXIBLE BOARD	
W501	1-642-186-11	FP-437 FLEXIBLE BOARD	

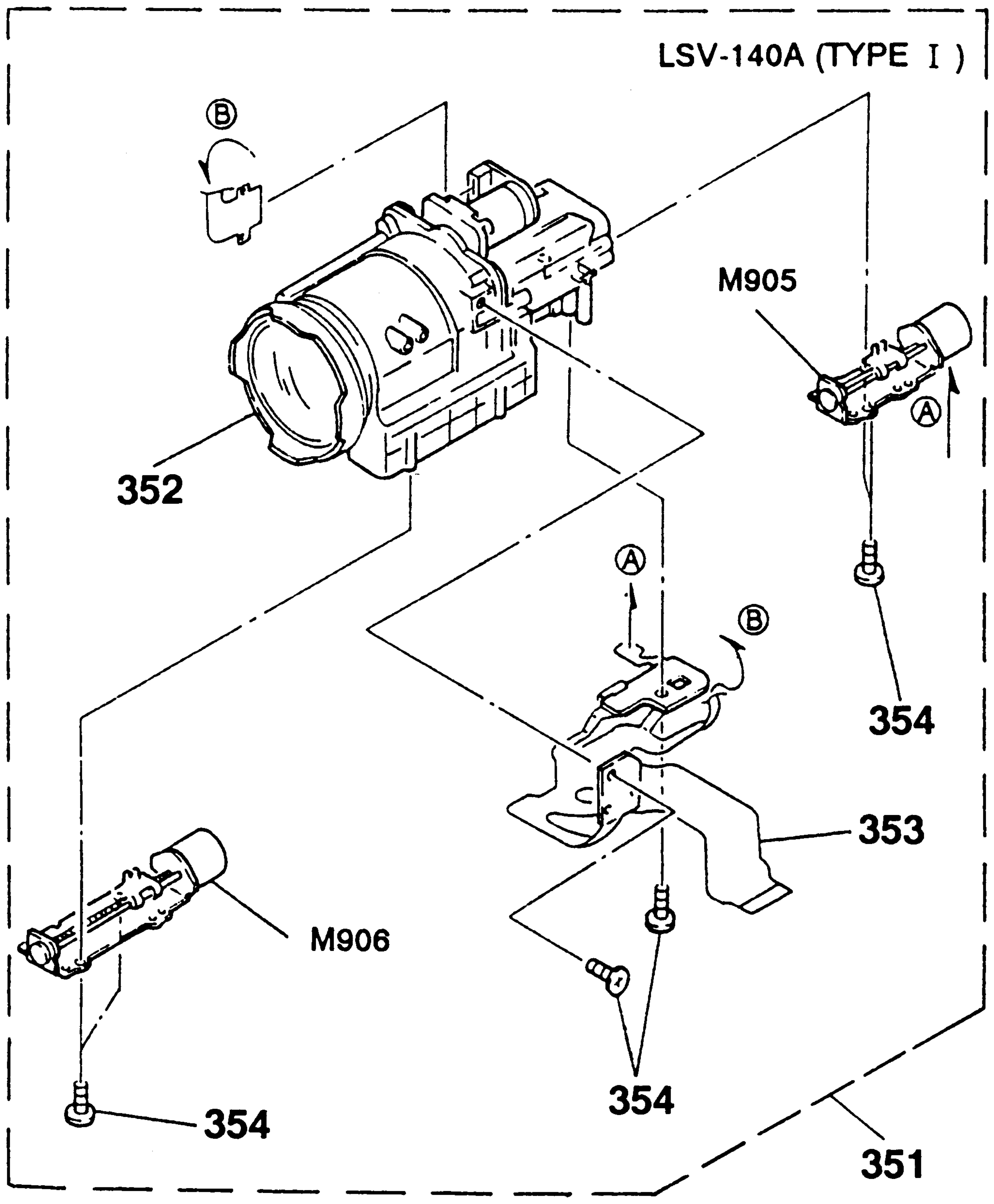
5-1-7. CCD BLOCK ASSEMBLY



Be sure to read "Note on the CCD Imager replacement" on page 4-5 when changing the CCD imager.

Ref. No.	Part No.	Description	Remark
301	3-719-381-01	SCREW (M2X4)	
302	3-713-786-21	SCREW (M2X3)	
303	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
303	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
303	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
304	1-651-904-81	FP-97 FLEXIBLE BOARD	
* 305	3-958-333-01	FRAME (PJ)	
306	3-958-286-01	SHEET METAL, TRIPOD	
307	3-958-310-01	HOLDER, TRIPOD	
308	3-947-268-01	SCREW (P TIGHT)(2), TAPPING, +B	
* 309	X-3944-147-1	FRAME (L) ASSY	
310	3-948-339-01	SCREW, TAPPING	
* 311	A-7066-306-A	MA-230 BOARD, COMPLETE	
* 312	3-958-328-01	FRAME (MA)	
313	3-946-856-01	ADAPTOR (H), CCD FITTING	
314	1-547-558-21	FILTER BLOCK, OPTICAL	
315	3-946-857-01	RUBBER (S), SEAL	
* 316	A-7072-137-A	CD-137 (D) BOARD, COMPLETE	
317	1-500-226-11	BEAD, FERRAITE	
IC691	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE)(CCD IMAGER)	
J201	1-537-726-11	TERMINAL BOARD	

5-1-8. ZOOM LENS ASSEMBLIES (LSV-140A) (VCL-5412WA) (VCL-5412WB)


LSV-140A (TYPE I)
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M905
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M906
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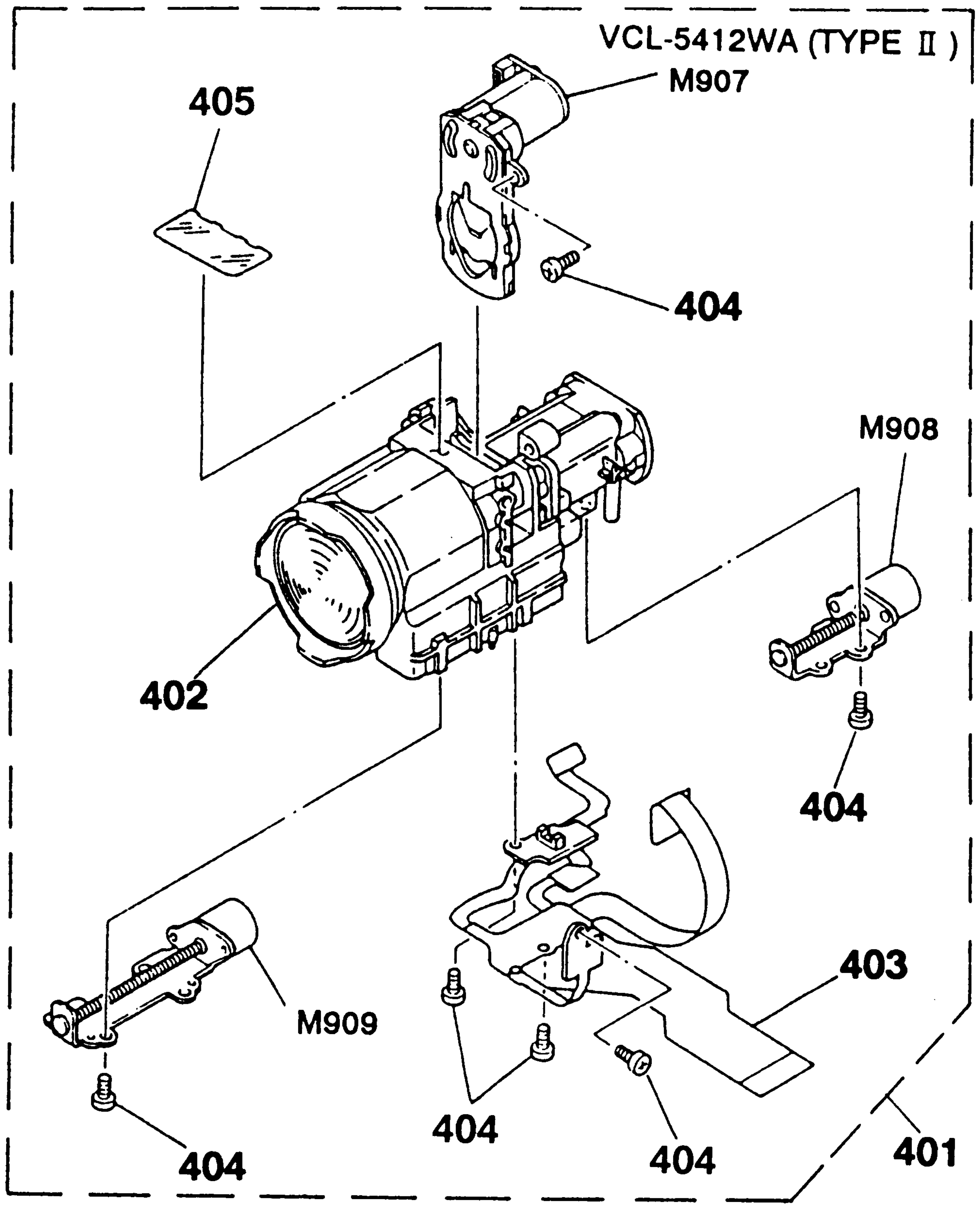
VCL-5412WA (TYPE II)
405
M907
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M908
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M909
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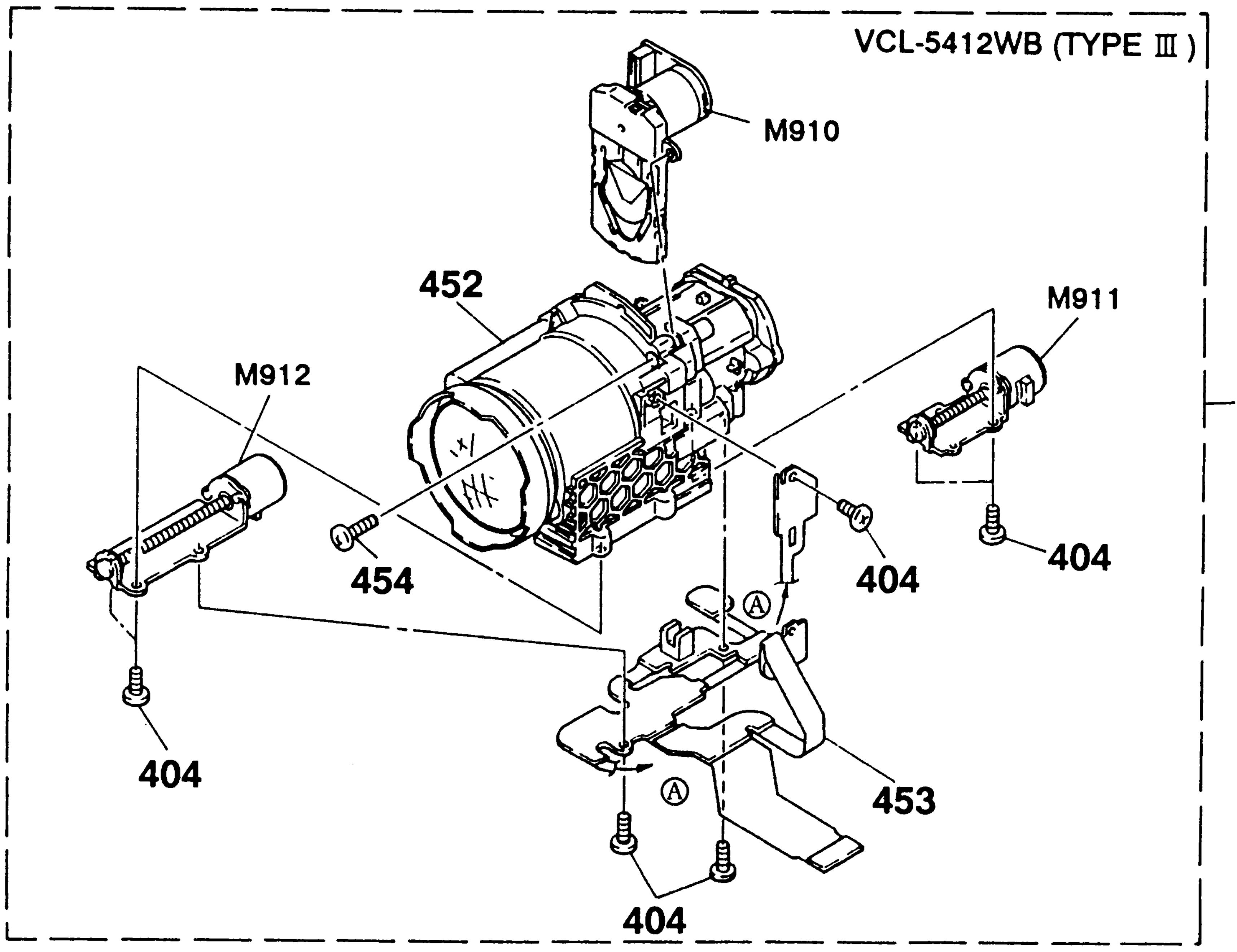
401


VCL-5412WB (TYPE III)
M910
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M911
M912
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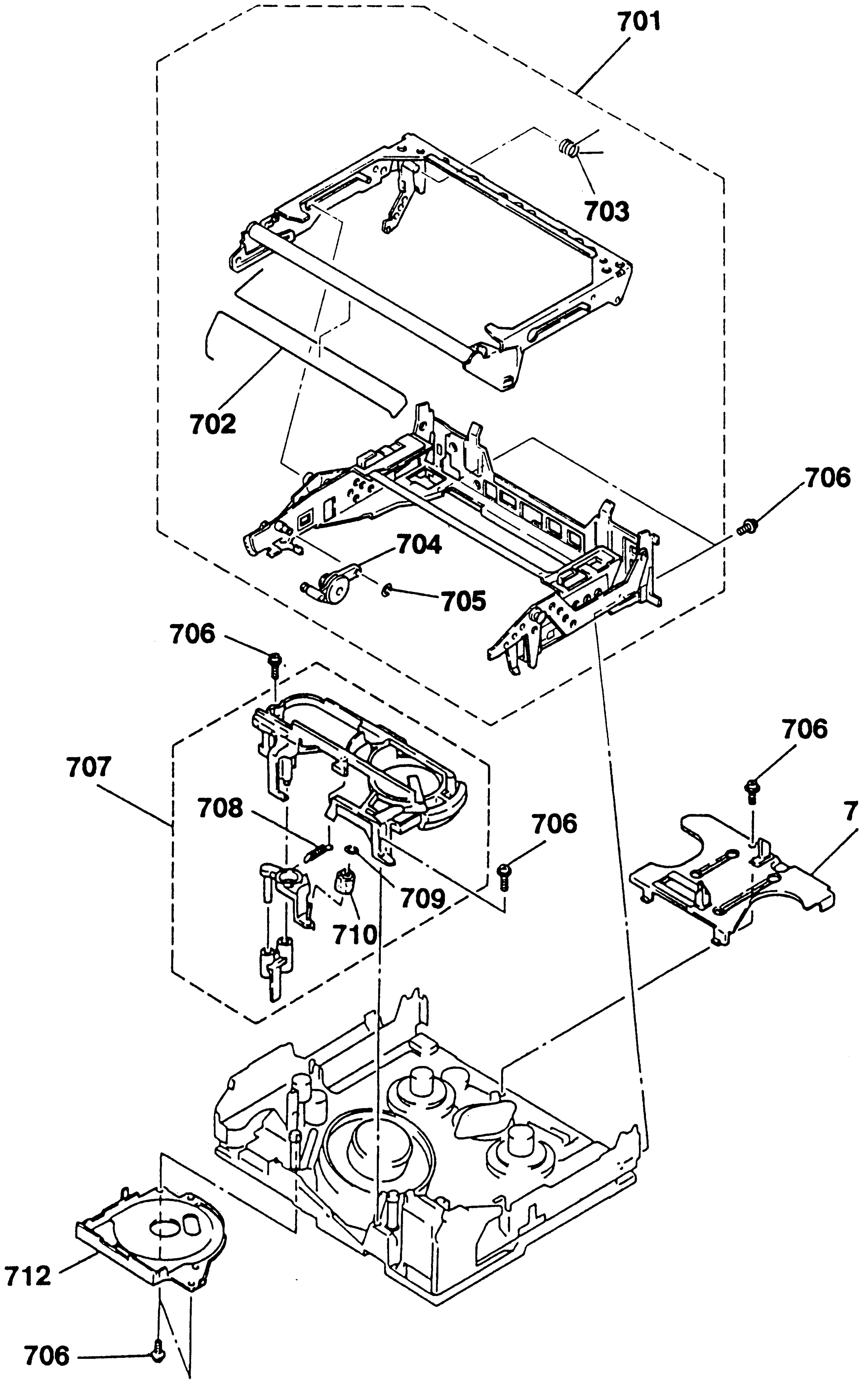
Ref. No.	Part No.	Description	Remark
351	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
352	A-4910-598-A	DEVICE ASSY, LSV-140A (RP)	
353	A-4915-338-A	FLEXIBLE MOUNT	
354	3-713-791-41	SCREW (M1.7X5), TAPPING, P2	
M905	1-698-364-01	MOTOR ASSY, FOCUS	
M906	1-698-363-01	MOTOR ASSY, ZOOM	
401	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
402	3-708-891-01	TUBE, MIRROR ASSY	
403	3-708-890-01	FLEXIBLE, MAIN	
404	3-708-302-01	SCREW (BT3 P1.7X4C)	
405	3-708-886-01	COVER, IG	
M907	3-708-888-01	METER, IG (IRIS)	
M908	3-708-889-01	MOTOR ASSY, FOCUS	
M909	3-708-887-01	MOTOR ASSY, ZOOM	
451	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
452	3-708-900-01	TUBE, MIRROR ASSY	
453	3-708-899-01	PC BOARD ASSY, FLEXIBLE	
454	3-708-617-01	SCREW (BT3 P1.7X7C)	
M910	3-708-898-01	IRIS ASSY	
M911	3-708-897-01	MOTOR ASSY, FOCUS	
M912	3-708-896-01	MOTOR ASSY, ZOOM	

5-1-9. CASSETTE COMPARTMENT ASSEMBLY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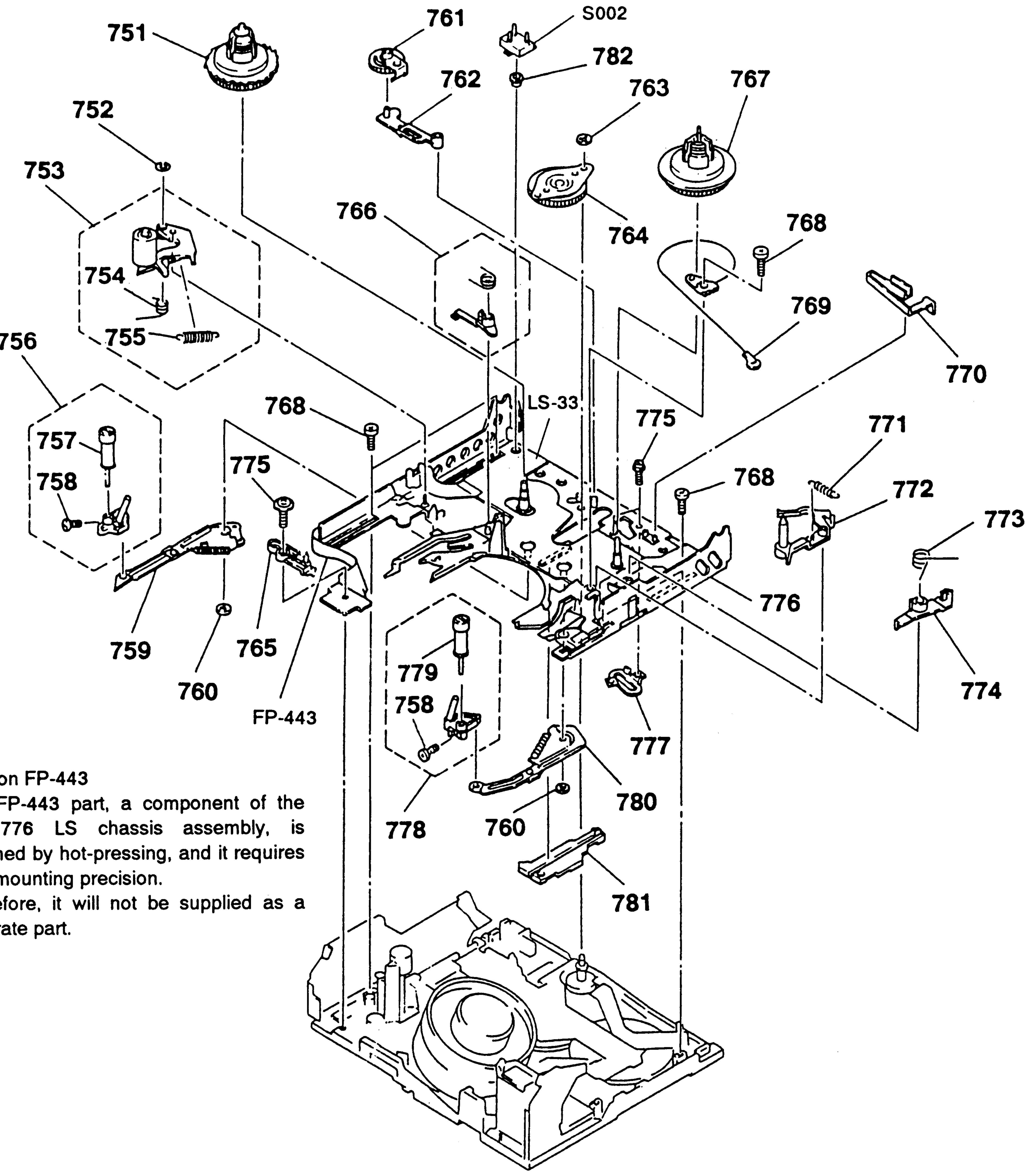
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
701	A-7040-312-K	CASSETTE COMPARTMENT BLOCK ASSY		707	A-7040-309-A	PROTECT (BASE) BLOCK ASSY	
702	3-945-773-01	BAR, TORSION		708	3-945-760-01	SPRING, TENSION	
703	3-945-771-01	SPRING, TORSION		709	3-321-393-01	WASHER, STOPPER	
704	X-3941-287-2	DAMPER ASSY		710	X-3166-813-1	ROLLER ASSY, HC	
705	3-315-384-31	WASHER, STOPPER					
				711	X-3941-280-1	RETAINER ASSY, GOOSENECK	
706	3-947-503-01	SCREW (M1.4X2.5)		712	3-945-733-01	COVER, CAPSTAN	

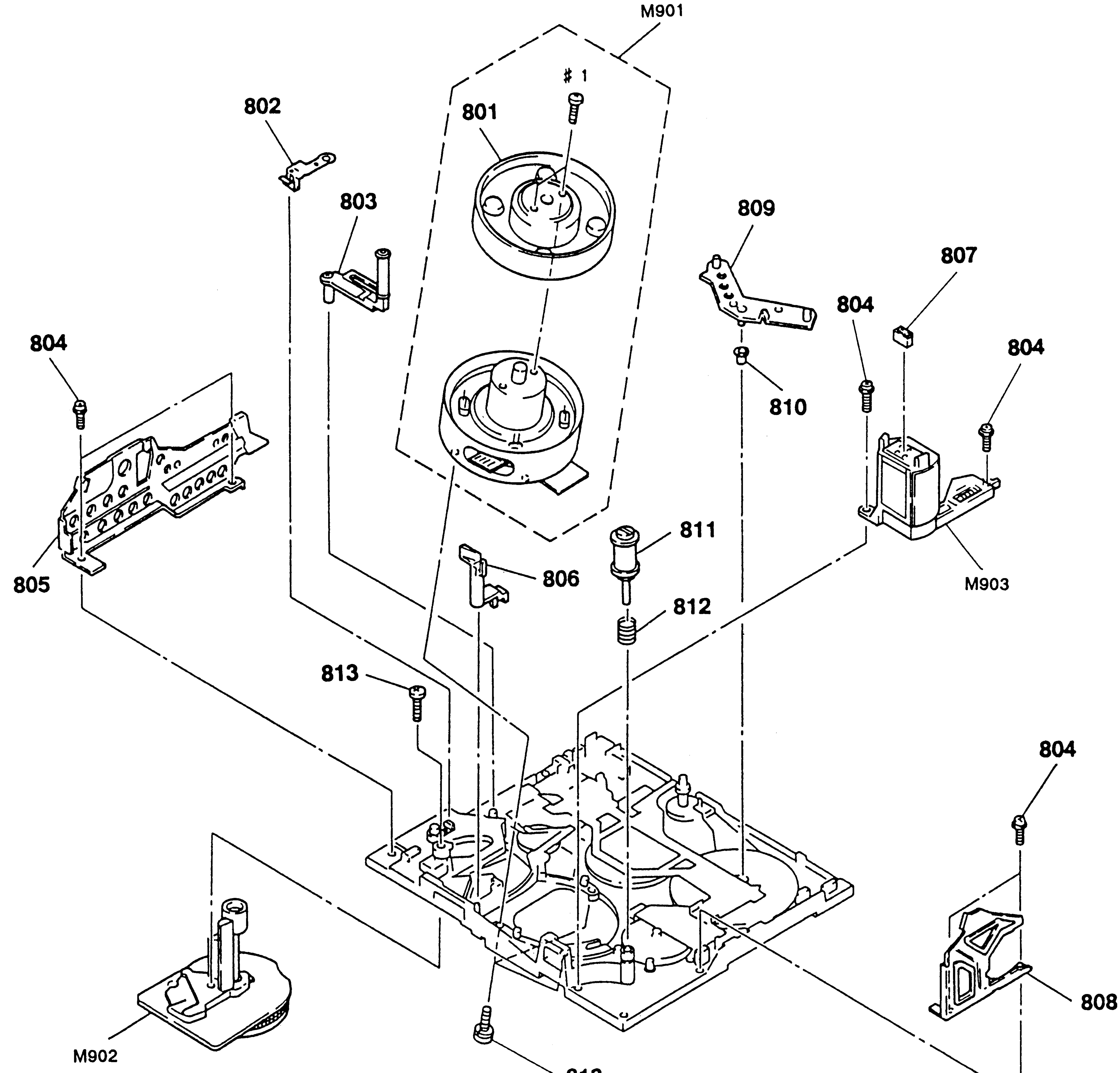
5-1-10. LS CHASSIS ASSEMBLY



Note on FP-443
The FP-443 part, a component of the No. 776 LS chassis assembly, is attached by hot-pressing, and it requires high mounting precision.
Therefore, it will not be supplied as a separate part.

Ref. No.	Part No.	Description	Remark
751	X-3941-274-1	TABLE ASSY, REEL, T	
752	3-331-007-21	WASHER	
753	X-3941-271-5	ARM ASSY, PINCH	
754	3-945-743-01	SPRING, TORSION	
755	3-945-783-01	SPRING, TENSION	
756	A-7040-307-A	GUIDE (BASE)(T) BLOCK ASSY	
757	X-3941-424-1	ROLLER ASSY, TG6	
758	3-947-504-01	SCREW (M1.2X2)	
759	X-3941-267-1	ARM (T) ASSY, GUIDE	
760	3-669-465-00	WASHER (1.5), STOPPER	
761	X-3941-273-1	SOFT ASSY, T	
762	3-945-753-01	ARM, T SOFT	
763	3-726-829-01	WASHER, STOPPER	
764	X-3941-279-5	GEAR ASSY, GOOSENECK	
765	3-947-644-01	RETAINER, TG5 (BASE)	
766	A-7040-321-A	CLAW BLOCK ASSY, T HARD	
767	X-3944-116-1	TABLE ASSY, S REEL	
768	3-945-756-01	SCREW (M1.4X3)	
769	X-3941-277-1	STRING BLOCK ASSY	
770	3-945-801-01	BRAKE, S SOFT	
771	3-954-327-01	SPRING, TENSION	
772	X-3941-276-1	TG1 ASSY	
773	3-945-752-01	SPRING, TORSION	
774	3-945-799-01	BRAKE, S HARD	
775	3-947-503-01	SCREW (M1.4X2.5)	
776	X-3943-307-1	CHASSIS ASSY, LS	
777	3-945-784-01	PLATE, CAM, LS	
778	A-7040-306-A	GUIDE (BASE)(S) BLOCK ASSY	
779	X-3941-269-1	ROLLER ASSY, TG3	
780	X-3941-266-1	ARM (S) ASSY, GUIDE	
781	3-945-837-01	SLIDER, GL	
782	3-949-881-01	SLEEVE	
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (REC PROOF, ME/MP, MP/MP-HG)	

5-1-11. MECHANISM CHASSIS ASSEMBLY (1)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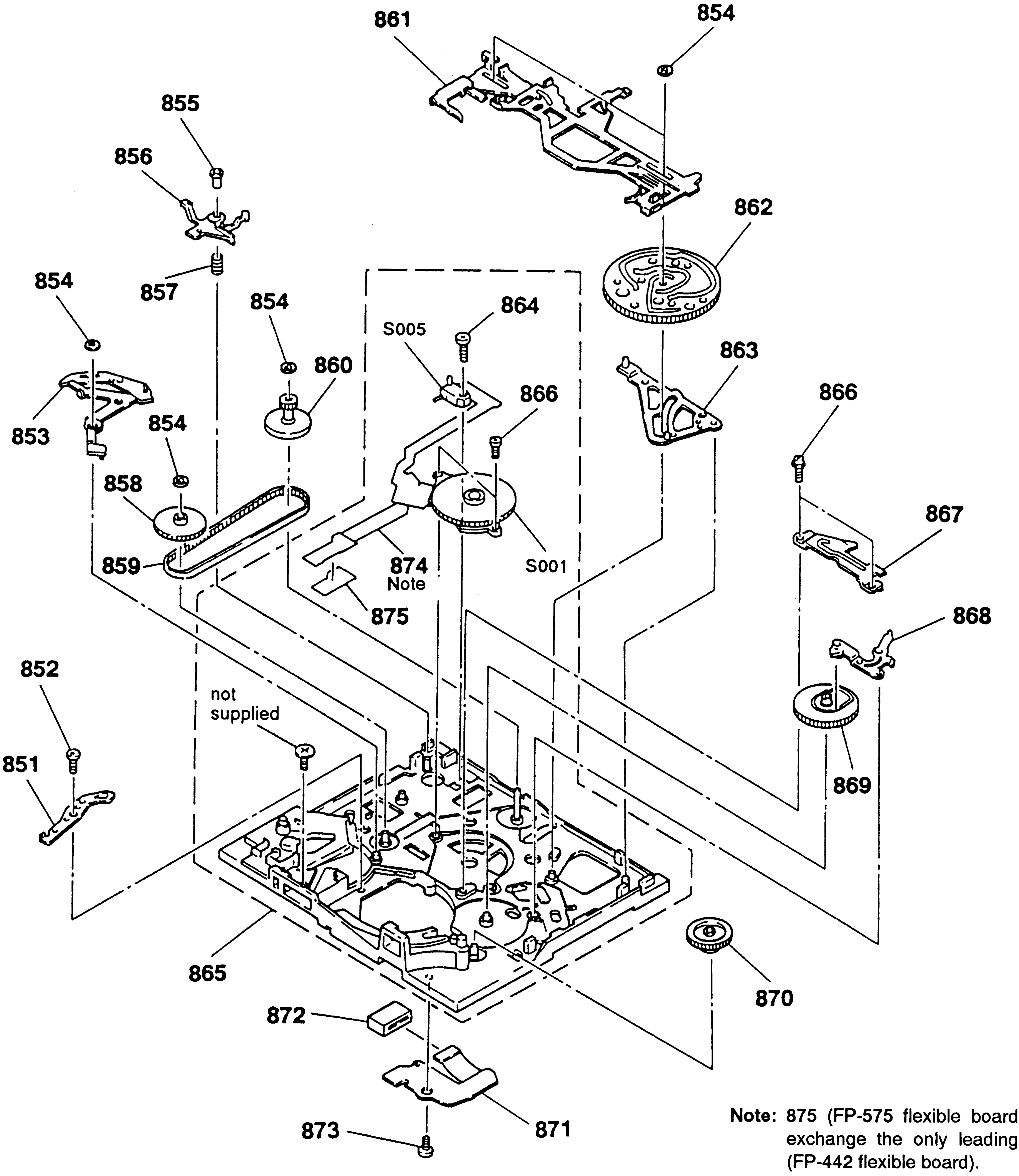
Ref. No.	Part No.	Description	Remark
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
802	3-945-822-01	SPRING, LEAF, TG7 ARM	
803	A-7040-305-A	ARM BLOCK ASSY, TG7	
804	3-947-503-01	SCREW (M1.4X2.5)	
805	X-3941-255-1	PLATE (T) ASSY, SIDE	
806	3-945-735-01	ARM, HC CONVERSION	
807	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
808	3-945-691-01	PLATE (S), SIDE	
809	3-945-701-01	ARM, LS	
810	3-945-702-01	ROLLER, LS	
811	X-3941-262-1	ROLLER ASSY, TG2	
812	3-956-651-01	SPRING, COMPRESSION	
813	3-686-493-01	SCREW (M2X5), P1	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	

5-1-12. MECHANISM CHASSIS ASSEMBLY (2)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S005
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S001
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Note: 875 (FP-575 flexible board) is part that exchange the only leading part of 874 (FP-442 flexible board).

Ref. No.	Part No.	Description	Remark
851	3-945-734-01	ARM, HC DRIVING	
852	3-728-103-11	SCREW (M1.4X1.6), SPECIAL HEAD	
853	X-3941-259-1	ARM ASSY, PINCH PRESS	
854	3-726-829-01	WASHER, STOPPER	
855	3-945-730-01	SLEEVE, EJECT	
856	3-945-706-01	LEVER, EJECT	
857	3-945-729-01	SPRING, COMPRESSION	
858	X-3941-256-1	GEAR ASSY, CHANGE	
859	3-944-539-01	BELT, RELAY	
860	3-945-695-01	PULLEY, RELAY	
861	X-3941-260-1	SLIDER ASSY, M	
862	3-945-696-02	CAM	
863	X-3941-258-3	ARM ASSY, GL	
864	3-713-786-71	SCREW (M2X5)	
865	A-7040-303-A	CHASSIS ASSY, MECHANICAL	
866	3-947-503-01	SCREW (M1.4X2.5)	
867	3-945-722-01	RETAINER, GEAR	
868	X-3941-257-1	ARM ASSY, FF	
869	3-945-697-01	GEAR (B), L	
870	3-945-700-01	GEAR (A), L	
871	1-641-643-12	FP-444 FLEXIBLE BOARD	
872	1-691-254-13	CONNECTOR, TRANSLATION 10P	
873	3-945-756-01	SCREW (M1.4X3)	
874	1-641-639-13	FP-442 FLEXIBLE BOARD	
875	1-645-271-11	FP-575 FLEXIBLE BOARD	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S005	1-570-771-21	SWITCH (C DOWN)	

5-2. ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Hardware (# mark) list is given in the last of this parts list.

- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

Ref. No.	Part No.	Description	Remark
*	A-7066-307-A	AU-182 BOARD, COMPLETE ***********************	
		(Ref. No. 3,000 Series)	
		< CAPACITOR >	
C402	1-165-176-11	CERAMIC CHIP 0.047uF 10% 16V	
C403	1-164-222-11	CERAMIC CHIP 0.22uF 25V	
C404	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C405	1-164-677-11	CERAMIC CHIP 0.033uF 10% 16V	
C407	1-162-957-11	CERAMIC CHIP 220PF 5% 50V	
C408	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C409	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C411	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C412	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C413	1-126-209-11	ELECT 100uF 20% 4V	
C414	1-128-006-11	ELECT CHIP 4.7uF 20% 25V	
C415	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C416	1-162-925-11	CERAMIC CHIP 68PF 5% 50V	
C419	1-162-967-11	CERAMIC CHIP 0.0033uF 10% 50V	
C421	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C422	1-216-864-11	METAL CHIP 0 5% 1/16W	
C424	1-162-923-11	CERAMIC CHIP 47PF 5% 50V	
C425	1-164-346-11	CERAMIC CHIP 1uF 16V	
C426	1-162-957-11	CERAMIC CHIP 220PF 5% 50V	
C427	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C428	1-128-006-11	ELECT CHIP 4.7uF 20% 25V	
C429	1-128-013-11	ELECT CHIP 1uF 20% 50V	
C430	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C431	1-162-969-11	CERAMIC CHIP 0.0068uF 10% 25V	
C432	1-164-674-11	CERAMIC CHIP 1800PF 5% 16V	
C433	1-164-346-11	CERAMIC CHIP 1uF 16V	
C434	1-128-003-11	ELECT CHIP 22uF 20% 4V	
C435	1-162-966-11	CERAMIC CHIP 0.0022uF 10% 50V	
C436	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C437	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C438	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C439	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C440	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C441	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C442	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C443	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
		< CONNECTOR >	
CN401	1-691-516-11	CONNECTOR, BOARD TO BOARD 24P	
CN402	1-691-487-21	CONNECTOR, FFC/FPC 8P	
		< IC >	
IC401	8-759-823-19	IC CXA1488R	
		< COIL >	
L401	1-412-954-11	INDUCTOR 18uH	
		< TRANSISTOR >	
Q404	8-729-402-81	TRANSISTOR XN4501	
		< RESISTOR >	
R401	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R403	1-216-859-11	METAL GLAZE 1.5M 5% 1/16W	
R404	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R407	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R409	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R411	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R412	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R415	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R416	1-216-864-11	METAL CHIP 0 5% 1/16W	
R418	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R420	1-216-832-11	METAL CHIP 8.2K 5% 1/16W	
R423	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R424	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R425	1-216-810-11	METAL CHIP 120 5% 1/16W	
R429	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R430	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R431	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R432	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R433	1-216-817-11	METAL CHIP 470 5% 1/16W	
R434	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R435	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R436	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R442	1-216-817-11	METAL CHIP 470 5% 1/16W	

****

CD-137 DD-76

Ref. No.	Part No.	Description	Remark
*	A-7072-137-A	CD-137 D BOARD, COMPLETE ************************** (Ref. No. 1,000 Series)	
		< CAPACITOR >	
C691	1-135-214-21	TANTAL. CHIP 4.7uF 20% 20V	
C692	1-135-210-11	TANTALUM CHIP 4.7uF 20% 10V	
C694	1-164-346-11	CERAMIC CHIP 1uF 16V	
C695	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
C696	1-104-908-11	TANTAL. CHIP 47uF 20% 4V	
		< IC >	
IC691	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE)(CCD IMAGER)	
		< COIL >	
L691	1-412-963-11	INDUCTOR 100uH	
		< TRANSISTOR >	
Q691	8-729-232-86	TRANSISTOR 2SK1875-BL/V	
Q692	8-729-117-73	TRANSISTOR 2SC4178-F14	
		< RESISTOR >	
R692	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R693	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R694	1-216-045-00	METAL CHIP 680 5% 1/10W	
R695	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R696	1-216-809-11	METAL CHIP 100 5% 1/16W	
R697	1-216-073-00	METAL CHIP 10K 5% 1/10W	
		< FLEXIBLE BOARD >	
W691	1-654-850-11	FP-276 FLEXIBLE BOARD	
W692	1-654-850-11	FP-276 FLEXIBLE BOARD	
**			
*	A-7066-308-A	DD-76 (SL) BOARD, COMPLETE ************************** (Ref. No. 5,000 Series)	
		< CAPACITOR >	
C901	1-164-492-11	CERAMIC CHIP 0.15uF 10% 16V	
C902	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C903	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C904	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C906	1-164-245-11	CERAMIC CHIP 0.015uF 10% 25V	
C907	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C908	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C909	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C910	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C911	1-162-963-11	CERAMIC CHIP 680PF 10% 50V	
C912	1-128-530-11	ELECT CHIP 33uF 20% 10V	
C913	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C914	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C915	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C917	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C918	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C920	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C921	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C923	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C924	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C925	1-164-506-11	CERAMIC CHIP 4.7uF 16V	
C926	1-164-337-11	CERAMIC CHIP 2.2uF 16V	
C927	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C928	1-165-178-11	CERAMIC CHIP 6.8uF 16V	
C929	1-135-216-11	TANTALUM CHIP 10uF 20% 10V	
C930	1-107-418-11	ELECT CHIP 10uF 20% 35V	
C931	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C932	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C934	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C936	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C938	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C939	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C940	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C941	1-163-019-00	CERAMIC CHIP 0.0068uF 10% 50V	
C942	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C943	1-163-019-00	CERAMIC CHIP 0.0068uF 10% 50V	
C944	1-164-161-11	CERAMIC CHIP 0.0022uF 10% 100V	
C945	1-128-530-11	ELECT CHIP 33uF 20% 10V	
C946	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C950	1-128-004-11	ELECT CHIP 10uF 20% 16V	
		< CONNECTOR >	
CN901	1-695-324-11	CONNECTOR, BOARD TO BOARD 42P	
		< DIODE >	
D901	8-719-027-77	DIODE MA796	
D909	8-719-404-49	DIODE MA111	
D910	8-719-404-49	DIODE MA111	
		< FUSE >	
⚠F450	1-576-213-11	FUSE, CHIP (1.6A 125V)	
⚠F451	1-576-213-11	FUSE, CHIP (1.6A 125V)	
⚠F452	1-576-213-11	FUSE, CHIP (1.6A 125V)	
		< IC >	
IC901	8-759-295-31	IC MB3799-03PFV-G-BND-ER	
		< JACK >	
J901	1-537-281-11	TERMINAL BOARD (BATTERY TERMINAL)	
J902	1-565-276-21	JACK, ULTRA SMALL 1P (LANC)	

Be sure to read "Note on the CCD Imager replacement" on page 4–5 when changing the CCD imager.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
J903	1-568-027-11	JACK, SMALL TYPE 1P (🎧)	
		< COIL >	
L901	1-424-653-11	COIL, CHOKE 10uH	
L902	1-424-653-11	COIL, CHOKE 10uH	
L903	1-424-653-11	COIL, CHOKE 10uH	
L904	1-409-556-11	COIL, CHOKE 47uH	
L905	1-424-674-11	COIL, CHOKE 22uH	
L906	1-409-556-11	COIL, CHOKE 47uH	
L907	1-424-674-11	COIL, CHOKE 22uH	
L908	1-424-674-11	COIL, CHOKE 22uH	
L909	1-412-056-11	INDUCTOR CHIP 4.7uH	
L910	1-412-056-11	INDUCTOR CHIP 4.7uH	
L912	1-412-056-11	INDUCTOR CHIP 4.7uH	
L914	1-412-064-11	INDUCTOR CHIP 100uH	
L915	1-412-064-11	INDUCTOR CHIP 100uH	
L916	1-412-056-11	INDUCTOR CHIP 4.7uH	
L917	1-412-056-11	INDUCTOR CHIP 4.7uH	
L918	1-216-296-00	METAL CHIP 0 5% 1/8W	
L919	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< TRANSISTOR >	
Q901	8-729-420-12	TRANSISTOR XN4213	
Q902	8-729-804-41	TRANSISTOR 2SB1122-S	
Q903	8-729-823-82	TRANSISTOR FP101	
Q904	8-729-823-84	TRANSISTOR FP102	
Q905	8-729-823-82	TRANSISTOR FP101	
Q906	8-729-823-82	TRANSISTOR FP101	
Q907	8-729-823-82	TRANSISTOR FP101	
Q909	8-729-805-25	TRANSISTOR 2SB1121	
Q914	8-729-402-42	TRANSISTOR UN5213	
Q915	8-729-402-42	TRANSISTOR UN5213	
		< RESISTOR >	
R901	1-218-872-11	METAL CHIP 11K 0.50% 1/16W	
R902	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R903	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R904	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R905	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R906	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R907	1-216-035-00	METAL CHIP 270 5% 1/10W	
R908	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R909	1-216-031-00	METAL CHIP 180 5% 1/10W	
R910	1-216-029-00	METAL CHIP 150 5% 1/10W	
R911	1-216-029-00	METAL CHIP 150 5% 1/10W	
R912	1-216-029-00	METAL CHIP 150 5% 1/10W	
R913	1-216-041-00	METAL CHIP 470 5% 1/10W	
R916	1-216-864-11	METAL CHIP 0 5% 1/16W	
R917	1-216-864-11	METAL CHIP 0 5% 1/16W	
R918	1-216-819-11	METAL CHIP 680 5% 1/16W	

Ref. No.	Part No.	Description	Remark
R919	1-216-836-11	METAL CHIP 18K 5% 1/16W	
R920	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R922	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R924	1-216-864-11	METAL CHIP 0 5% 1/16W	
R925	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R927	1-216-864-11	METAL CHIP 0 5% 1/16W	
R928	1-216-852-11	METAL CHIP 390K 5% 1/16W	
R932	1-216-864-11	METAL CHIP 0 5% 1/16W	
R936	1-216-864-11	METAL CHIP 0 5% 1/16W	
R937	1-216-864-11	METAL CHIP 0 5% 1/16W	
R938	1-216-864-11	METAL CHIP 0 5% 1/16W	
R940	1-216-864-11	METAL CHIP 0 5% 1/16W	
R941	1-218-849-11	METAL CHIP 1.2K 0.50% 1/16W	
R944	1-216-864-11	METAL CHIP 0 5% 1/16W	
R945	1-218-847-11	METAL CHIP 1K 0.50% 1/16W	
		< TRANSFORMER >	
T901	1-426-938-11	TRANSFORMER, DC/DC CONVERTER	
**			
*	A-7071-913-A	FF-75 BOARD, COMPLETE (FX340) ***************************** (Ref. No. 4,000 Series)	
		< FLUORESCENT TUBE >	
⚠BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH)	
		< CONNECTOR >	
CN954	1-580-248-31	CONNECTOR, BOARD TO BOARD 20P	
**			
		LS-33 BOARD (Ref. No. 6,000 Series) ***********	
		< DIODE >	
D001	8-719-989-52	DIODE GL4600S	
		< HALL ELEMENT >	
H001	8-719-987-62	DIODE LT140SAZ	
H002	8-719-987-62	DIODE LT140SAZ	
		< TRANSISTOR >	
Q001	8-729-012-46	TRANSISTOR PT4600FS	
Q002	8-729-012-46	TRANSISTOR PT4600FS	
		< RESISTOR >	
R003	1-216-033-00	METAL CHIP 220 5% 1/10W	
R004	1-216-033-00	METAL CHIP 220 5% 1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
R010	1-216-033-00	METAL CHIP 220 5% 1/10W	
R011	1-216-033-00	METAL CHIP 220 5% 1/10W	
		< SWITCH >	
S002	1-572-987-11	SWITCH, PUSH (3 KEY)(TAPE SELECT)	

****

Ref. No.	Part No.	Description	Remark
*	A-7066-306-A	MA-230 BOARD, COMPLETE	

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(Ref. No. 3,000 Series)

Ref. No.	Part No.	Description	Remark
		< CAPACITOR >	
C014	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C015	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C032	1-164-346-11	CERAMIC CHIP 1uF 16V	
C033	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C034	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C035	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C036	1-107-823-11	CERAMIC CHIP 0.47uF 10% 16V	
C037	1-164-346-11	CERAMIC CHIP 1uF 16V	
C040	1-126-205-11	ELECT CHIP 47uF 20% 6.3V	
C041	1-163-023-00	CERAMIC CHIP 0.015uF 5% 50V	
C043	1-128-004-11	ELECT CHIP 10uF 20% 16V	
C045	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
		< CONNECTOR >	
* CN001	1-764-517-11	CONNECTOR, FFC/FPC (ZIF) 7P	
* CN003	1-580-055-21	PIN, CONNECTOR 2P	
		< IC >	
IC002	8-749-923-29	IC RS-20E-T	
IC003	8-759-822-37	IC LA7293M	
		< JACK >	
J001	1-568-027-11	JACK, SMALL TYPE 1P (MIC)	
		< COIL >	
L002	1-216-295-91	CONDCTOR, CHIP (2012)	
L003	1-216-295-91	CONDCTOR, CHIP (2012)	
		< TRANSISTOR >	
Q002	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
		< RESISTOR >	
R028	1-216-822-11	METAL CHIP 1.2K 5% 1/16W	
R029	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R030	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R031	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R032	1-216-831-11	METAL CHIP 6.8K 5% 1/16W	
R033	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R044	1-216-853-11	METAL CHIP 470K 5% 1/16W	
R045	1-216-834-11	METAL CHIP 12K 5% 1/16W	

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Ref. No.	Part No.	Description	Remark
*	A-7072-174-A	SL-38 (SL) BOARD, COMPLETE	

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(Ref. No. 3,000 Series)

Ref. No.	Part No.	Description	Remark
		< CAPACITOR >	
C543	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C544	1-163-059-91	CERAMIC CHIP 0.01uF 10% 50V	
C545	1-163-059-91	CERAMIC CHIP 0.01uF 10% 50V	
C546	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C547	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C551	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
C553	1-164-361-11	CERAMIC CHIP 0.047uF 16V	
C554	1-107-682-11	CERAMIC CHIP 1uF 10% 16V	
C555	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	
C556	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C557	1-135-149-21	TANTALUM CHIP 2.2uF 20% 10V	
C558	1-164-489-11	CERAMIC CHIP 0.22uF 10% 16V	
		< CONNECTOR >	
CN500	1-691-473-21	CONNECTOR, FFC/FPC 7P	
CN501	1-691-472-21	CONNECTOR, FFC/FPC 6P	
CN502	1-691-482-21	CONNECTOR, FFC/FPC 15P	
		< IC >	
IC507	8-759-165-47	IC MPC1780VFUEB	
		< COIL >	
L505	1-216-295-91	CONDCTOR, CHIP (2012)	
		< TRANSISTOR >	
Q560	8-729-805-25	TRANSISTOR 2SB1121	
Q561	8-729-425-50	TRANSISTOR 2SB1462Q	
Q562	8-729-402-81	TRANSISTOR XN4501	
		< RESISTOR >	
R562	1-218-879-11	METAL CHIP 22K 0.50% 1/16W	
R563	1-218-879-11	METAL CHIP 22K 0.50% 1/16W	
R564	1-216-864-11	METAL CHIP 0 5% 1/16W	
R565	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R566	1-218-857-11	METAL CHIP 2.7K 0.50% 1/16W	
R567	1-216-295-91	CONDCTOR, CHIP (2012)	
R568	1-216-168-00	METAL GLAZE 56 5% 1/8W	
R569	1-218-879-11	METAL CHIP 22K 0.50% 1/16W	
R570	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R571	1-218-879-11	METAL CHIP 22K 0.50% 1/16W	

Ref. No.	Part No.	Description			Remark
R572	1-216-841-11	METAL CHIP	47K	5%	1/16W
R590	1-216-833-11	METAL CHIP	10K	5%	1/16W
R591	1-216-832-11	METAL CHIP	8.2K	5%	1/16W

< FLEXIBLE BOARD >

Ref. No.	Part No.	Description
W500	1-651-889-11	FP-48 FLEXIBLE BOARD
W501	1-642-186-11	FP-437 FLEXIBLE BOARD

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* A-7066-309-A VC-159 (SL) BOARD, COMPLETE
****
(Ref. No. 2,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C601	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C604	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C606	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C607	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C608	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C610	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C611	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C613	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C614	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C616	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C617	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C618	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C619	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C620	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C621	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C622	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C623	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C624	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C627	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C628	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C629	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C630	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C632	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C633	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C637	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C638	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C641	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C642	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C643	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C696	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C701	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C702	1-162-638-11	CERAMIC CHIP	1uF		16V
C703	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C704	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C705	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C706	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C708	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C709	1-163-077-91	CERAMIC CHIP	0.1uF		50V
C710	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C711	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C712	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C713	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C715	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C716	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C717	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C718	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C719	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C721	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C725	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C726	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C727	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C728	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C729	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C730	1-164-298-11	CERAMIC CHIP	0.15uF	10%	25V
C731	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C732	1-162-638-11	CERAMIC CHIP	1uF		16V
C733	1-162-638-11	CERAMIC CHIP	1uF		16V
C734	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C735	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C739	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C743	1-162-638-11	CERAMIC CHIP	1uF		16V
C745	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C746	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C747	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C748	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C750	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C751	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C752	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C753	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C754	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C755	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C756	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C757	1-162-974-11	CERAMIC CHIP	0.01uF		50V

< CONNECTOR >

Ref. No.	Part No.	Description
* CN601	1-764-395-21	CONNECTOR, BOARD TO BOARD 42P
* CN701	1-573-356-11	CONNECTOR, FFC/FPC 16P
CN751	1-573-361-11	CONNECTOR, FFC/FPC 21P

< TRIMMER >

Ref. No.	Part No.	Description
CT701	1-141-356-11	CAP, ADJ

< DIODE >

Ref. No.	Part No.	Description	
D701	8-719-404-46	DIODE	MA110
D702	8-719-404-46	DIODE	MA110

Ref.No.	Part No.	Description	Remark
D703	8-719-404-46	DIODE MA110	
D705	8-719-404-46	DIODE MA110	
		< FILTER >	
FL601	1-239-766-11	FILTER, LOW PASS	
		< IC >	
IC601	8-759-278-57	IC AK6420HF	
IC602	8-759-332-94	IC SC424614MC68HC11MA8FU	
IC603	8-759-064-36	IC MB88346BPFV	
IC604	8-759-710-29	IC NJM2235M	
IC609	8-752-369-23	IC CXD2150AR	
IC610	8-752-365-72	IC CXD2151R	
IC611	8-759-262-36	IC CXD2133BR	
IC614	8-759-255-09	IC uPD6461GS-802-GLG-E2	
IC701	8-752-355-07	IC CXD1267N	
IC702	8-752-365-74	IC CXD1266R	
IC703	8-752-069-21	IC CXA1690Q	
IC704	8-759-070-51	IC SN74HCU04ADB	
IC705	8-752-375-12	IC CXD2407BR	
IC751	8-759-701-24	IC NJM3414M	
IC752	8-759-058-52	IC XRA10324AF	
IC753	8-752-365-65	IC CXD2126N	
IC754	8-759-247-07	IC MPC17A34VMEL	
IC755	8-759-031-58	IC SC7SU04F	
		< COIL >	
L601	1-412-058-11	INDUCTOR CHIP 10uH	
L604	1-414-078-11	INDUCTOR 10uH	
L605	1-410-391-11	INDUCTOR CHIP 68uH	
L608	1-412-006-31	INDUCTOR CHIP 10uH	
L704	1-412-058-11	INDUCTOR CHIP 10uH	
L751	1-412-062-11	INDUCTOR CHIP 47uH	
		< TRANSISTOR >	
Q604	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q605	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q606	8-729-602-21	TRANSISTOR 2SC4154	
Q607	8-729-602-21	TRANSISTOR 2SC4154	
Q701	8-729-403-27	TRANSISTOR XN4401	
Q751	8-729-602-21	TRANSISTOR 2SC4154	
Q752	8-729-013-88	TRANSISTOR RN1302	
		< RESISTOR >	
R601	1-216-851-11	METAL CHIP 330K 5% 1/16W	
R602	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R603	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R604	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R605	1-216-864-11	METAL CHIP 0 5% 1/16W	

Ref.No.	Part No.	Description	Remark
R606	1-216-847-11	METAL CHIP 150K 5% 1/16W	
R607	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R608	1-216-864-11	METAL CHIP 0 5% 1/16W	
R609	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R610	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R611	1-216-838-11	METAL CHIP 27K 5% 1/16W	
R612	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R613	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R619	1-216-803-11	METAL CHIP 33 5% 1/16W	
R620	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R621	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R624	1-216-864-11	METAL CHIP 0 5% 1/16W	
R626	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R627	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R628	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R629	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R630	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R631	1-216-864-11	METAL CHIP 0 5% 1/16W	
R634	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R635	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R636	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R637	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R638	1-216-839-11	METAL CHIP 33K 5% 1/16W	
R640	1-216-815-11	METAL CHIP 330 5% 1/16W	
R642	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R643	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R645	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R646	1-216-818-11	METAL CHIP 560 5% 1/16W	
R647	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R648	1-216-818-11	METAL CHIP 560 5% 1/16W	
R649	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R650	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R651	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R652	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R654	1-216-864-11	METAL CHIP 0 5% 1/16W	
R656	1-216-864-11	METAL CHIP 0 5% 1/16W	
R658	1-216-864-11	METAL CHIP 0 5% 1/16W	
R659	1-216-823-11	METAL CHIP 1.5K 5% 1/16W	
R661	1-216-841-11	METAL CHIP 47K 5% 1/16W	
R662	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R663	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R664	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R665	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R666	1-216-827-11	METAL CHIP 3.3K 5% 1/16W	
R667	1-216-820-11	METAL CHIP 820 5% 1/16W	
R668	1-216-824-11	METAL CHIP 1.8K 5% 1/16W	
R669	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R670	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R671	1-216-296-00	METAL CHIP 0 5% 1/8W	
R701	1-216-857-11	METAL CHIP 1M 5% 1/16W	

Ref. No.	Part No.	Description				Remark
R702	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R703	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R705	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R709	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R710	1-216-864-11	METAL CHIP	0	5%	1/16W	
R712	1-216-864-11	METAL CHIP	0	5%	1/16W	
R713	1-216-807-11	METAL CHIP	68	5%	1/16W	
R714	1-216-864-11	METAL CHIP	0	5%	1/16W	
R716	1-218-847-11	METAL CHIP	1K	0.50%	1/16W	
R718	1-216-864-11	METAL CHIP	0	5%	1/16W	
R719	1-218-876-11	METAL CHIP	16K	0.50%	1/16W	
R724	1-216-864-11	METAL CHIP	0	5%	1/16W	
R725	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R728	1-216-864-11	METAL CHIP	0	5%	1/16W	
R729	1-216-864-11	METAL CHIP	0	5%	1/16W	
R731	1-216-864-11	METAL CHIP	0	5%	1/16W	
R740	1-216-864-11	METAL CHIP	0	5%	1/16W	
R741	1-218-855-11	METAL CHIP	2.2K	0.50%	1/16W	
R742	1-218-865-11	METAL CHIP	5.6K	0.50%	1/16W	
R743	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R744	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R745	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R746	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R747	1-216-820-11	METAL CHIP	820	5%	1/16W	
R748	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R749	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R750	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R751	1-216-809-11	METAL CHIP	100	5%	1/16W	
R752	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R753	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R754	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R755	1-216-855-11	METAL CHIP	680K	5%	1/16W	
R756	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R757	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R758	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R759	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R760	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R761	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R762	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R764	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R798	1-216-296-00	METAL CHIP	0	5%	1/8W	
R799	1-216-296-00	METAL CHIP	0	5%	1/8W	
		< VIBRATOR >				
X601	1-760-081-21	VIBRATOR, CERAMIC (24MHz)				
X701	1-760-320-11	VIBRATOR, CRYSTAL (28.6363MHz)				

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Ref. No.	Part No.	Description				Remark
*	A-7063-947-A	VF-44 BOARD, COMPLETE (FX240)				
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		(Ref. No. 4,000 Series)				
		< CAPACITOR >				
C501	1-163-113-00	CERAMIC CHIP	68PF	5%	50V	
C502	1-126-176-11	ELECT	220uF	20%	10V	
C503	1-163-077-91	CERAMIC CHIP	0.1uF		50V	
C504	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	
⚠C505	1-162-625-11	CERAMIC CHIP	0.0047uF	5%	50V	
⚠C506	1-164-758-11	CERAMIC CHIP	0.0039uF	5%	50V	
C508	1-127-515-11	ELECT(SOLID)	47uF	20%	6.3V	
C509	1-126-090-11	ELECT	82uF	20%	10V	
C510	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V	
C511	1-124-257-00	ELECT	2.2uF	20%	50V	
C512	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	
C513	1-137-306-11	FILM CHIP	0.1uF	5%	16V	
C514	1-162-638-11	CERAMIC CHIP	1uF		16V	
C515	1-131-381-00	TANTALUM	47uF	10%	10V	
C516	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V	
C517	1-135-091-91	TANTAL. CHIP	1uF	20%	16V	
		< CONNECTOR >				
CN501	1-953-265-11	HARNESS (VF-64)				
* CN502	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P				
* CN503	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P				
		< DIODE >				
D501	8-719-024-87	DIODE LN1261CAL (TALLY)				
D502	8-719-024-87	DIODE LN1261CAL (TALLY)				
D503	8-719-400-20	DIODE MA152WA				
		< IC >				
IC501	8-759-196-14	IC BA7149F				
		< COIL >				
L501	1-412-031-11	INDUCTOR CHIP 47uH				
L502	1-410-385-11	INDUCTOR CHIP 22uH				
⚠L503	1-459-876-41	COIL, FERRITE (HLC)				
		< TRANSISTOR >				
Q501	8-729-216-31	TRANSISTOR 2SA1163-G				
Q502	8-729-120-28	TRANSISTOR 2SC1623-L5L6				
Q503	8-729-106-68	TRANSISTOR 2SD1615A-GP				
		< RESISTOR >				
R501	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R502	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R503	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R504	1-216-041-00	METAL CHIP	470	5%	1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
R505	1-216-041-00	METAL CHIP 470 5% 1/10W	
R506	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R507	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	
R508	1-216-005-00	METAL CHIP 15 5% 1/10W	
R509	1-216-870-11	METAL CHIP 180K 1% 1/10W	
R510	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R511	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	
R512	1-216-133-00	METAL CHIP 3.3M 5% 1/10W	
R513	1-216-125-00	METAL CHIP 1.5M 5% 1/10W	
R514	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R515	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	
R516	1-216-025-00	METAL CHIP 100 5% 1/10W	
R517	1-216-308-00	METAL CHIP 4.7 5% 1/10W	
R518	1-216-683-11	METAL CHIP 22K 0.5% 1/10W	
R519	1-208-824-11	METAL CHIP 56K 0.50% 1/10W	
R520	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R521	1-216-160-00	METAL GLAZE 27 5% 1/8W	
R522	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R523	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R524	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R525	1-216-031-00	METAL CHIP 180 5% 1/10W	
R526	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	
R528	1-216-077-00	METAL CHIP 15K 5% 1/10W	

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description	Remark
RV501	1-238-088-11	RES, ADJ, CERMET 2.2K	
RV502	1-223-565-11	RES, VAR, CARBON (4 TYPE)	
RV503	1-238-096-11	RES, ADJ CERMET 1M	
RV505	1-238-086-11	RES, ADJ, CERMET 470	

< TRANSFORMER >

Ref. No.	Part No.	Description	Remark
⚠T501	1-439-525-11	TRANSFORMER ASSY, FLYBACK	

< THERMISTOR >

Ref. No.	Part No.	Description	Remark
TH501	1-809-350-21	THERMISTOR, NTC (2125)	

< SOCKET >

Ref. No.	Part No.	Description	Remark
⚠W502	1-526-978-51	SOCKET ASSY, CRT	

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* A-7063-779-A VF-68 BOARD, COMPLETE (FX340)

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(Ref. No. 4,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description	Remark
C804	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
C805	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C806	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C807	1-164-505-11	CERAMIC CHIP 2.2uF 16V	
C808	1-135-145-11	TANTALUM CHIP 0.47uF 10% 35V	
C809	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C810	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C811	1-135-091-91	TANTAL. CHIP 1uF 20% 16V	
C812	1-135-179-21	TANTAL. CHIP 2.2uF 20% 16V	
C813	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C814	1-135-259-11	TANTAL. CHIP 10uF 20% 6.3V	
C815	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C816	1-164-699-11	CERAMIC CHIP 0.0033uF 5% 50V	
C817	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C818	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C819	1-162-927-11	CERAMIC CHIP 100PF 5% 50V	
C820	1-164-357-11	CERAMIC CHIP 1000PF 5% 50V	
C821	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C822	1-164-156-11	CERAMIC CHIP 0.1uF 25V	
C823	1-164-346-11	CERAMIC CHIP 1uF 16V	
C824	1-162-968-11	CERAMIC CHIP 0.0047uF 10% 50V	
C825	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C828	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C829	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C830	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C832	1-162-964-11	CERAMIC CHIP 0.001uF 10% 50V	
C833	1-164-361-11	CERAMIC CHIP 0.047uF 16V	
C834	1-164-361-11	CERAMIC CHIP 0.047uF 16V	
C835	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C838	1-162-919-11	CERAMIC CHIP 22PF 5% 50V	
C839	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C840	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C842	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C844	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C845	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C846	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C847	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C848	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C849	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C850	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C851	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C852	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C853	1-164-360-11	CERAMIC CHIP 0.1uF 16V	
C862	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C863	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C864	1-135-179-21	TANTAL. CHIP 2.2uF 20% 16V	
C865	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C866	1-162-921-11	CERAMIC CHIP 33PF 5% 50V	
C867	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C868	1-164-346-11	CERAMIC CHIP 1uF 16V	
C872	1-162-974-11	CERAMIC CHIP 0.01uF 50V	
C873	1-164-005-11	CERAMIC CHIP 0.47uF 25V	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
		< CONNECTOR >	
CN801	1-573-990-21	CONNECTOR, BOARD TO BOARD 10P	
* CN802	1-573-356-11	CONNECTOR, FFC/FPC 16P	
CN803	1-573-351-11	CONNECTOR, FFC/FPC 11P	
		< DIODE >	
D801	8-719-025-91	DIODE MA365	
D802	8-719-984-02	DIODE BR4371F (TALLY)	
		< IC >	
IC801	8-752-058-96	IC CXA1585Q	
IC802	8-752-058-95	IC CXA1515Q	
IC803	8-752-362-78	IC CXD2403R	
		< COIL >	
L801	1-414-078-11	INDUCTOR 10uH	
L803	1-414-078-11	INDUCTOR 10uH	
L805	1-412-962-11	INDUCTOR 82uH	
L806	1-412-962-11	INDUCTOR 82uH	
L807	1-412-962-11	INDUCTOR 82uH	
L808	1-412-950-11	INDUCTOR 8.2uH	
L809	1-412-962-11	INDUCTOR 82uH	
L810	1-410-192-51	INDUCTOR CHIP 1uH	
		< TRANSISTOR >	
Q801	8-729-427-74	TRANSISTOR XP4601	
Q802	8-729-425-64	TRANSISTOR 2SD2216Q	
		< RESISTOR >	
R801	1-218-958-11	METAL GLAZE 2.7K 5% 1/16W	
R802	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R803	1-218-955-11	METAL GLAZE 1.5K 5% 1/16W	
R805	1-218-962-11	METAL GLAZE 5.6K 5% 1/16W	
R806	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R807	1-218-970-11	METAL GLAZE 27K 5% 1/16W	
R808	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R809	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R810	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R811	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R812	1-218-966-11	METAL GLAZE 12K 5% 1/16W	
R813	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R814	1-218-989-11	METAL GLAZE 1M 5% 1/16W	
R815	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R816	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R817	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R818	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R819	1-218-980-11	METAL GLAZE 180K 5% 1/16W	
R820	1-218-970-11	METAL GLAZE 27K 5% 1/16W	
R821	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R822	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R823	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R824	1-218-990-11	CONDCTOR, CHIP (1005)	
R825	1-218-989-11	METAL GLAZE 1M 5% 1/16W	
R826	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R827	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R828	1-218-984-11	METAL GLAZE 390K 5% 1/16W	
R829	1-218-984-11	METAL GLAZE 390K 5% 1/16W	
R830	1-218-984-11	METAL GLAZE 390K 5% 1/16W	
R831	1-218-944-11	METAL GLAZE 180 5% 1/16W	
R833	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R834	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R835	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R836	1-218-976-11	METAL GLAZE 82K 5% 1/16W	
R837	1-218-990-11	CONDCTOR, CHIP (1005)	
R838	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R839	1-218-990-11	CONDCTOR, CHIP (1005)	
R840	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R841	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R842	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R843	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R849	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R850	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R856	1-218-990-11	CONDCTOR, CHIP (1005)	
R861	1-218-873-11	METAL CHIP 12K 0.50% 1/16W	
R862	1-218-905-11	METAL CHIP 270K 0.50% 1/16W	
R863	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R864	1-218-981-11	METAL GLAZE 220K 5% 1/16W	
R865	1-218-953-11	METAL GLAZE 1K 5% 1/16W	
R866	1-218-952-11	METAL GLAZE 820 5% 1/16W	
R867	1-218-967-11	METAL GLAZE 15K 5% 1/16W	
R868	1-218-966-11	METAL GLAZE 12K 5% 1/16W	
		< VARIABLE RESISTOR >	
RV802	1-241-480-11	RES, ADJ, CERMET 47K	
RV803	1-241-480-11	RES, ADJ, CERMET 47K	
RV804	1-241-480-11	RES, ADJ, CERMET 47K	
		< VIBRATOR >	
X801	1-579-466-11	VIBRATOR, CRYSTAL (3.58MHz)	

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⚠ A-7063-780-A VF-69 BOARD, COMPLETE (FX340)

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(Ref. No. 4,000 Series)

		< CAPACITOR >	
C951	1-135-181-21	TANTALUM CHIP 4.7uF 20% 6.3V	
C954	1-164-346-11	CERAMIC CHIP 1uF 16V	
C955	1-164-676-11	CERAMIC CHIP 2200PF 5% 16V	

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Ref. No.	Part No.	Description	Remark
C957	1-162-967-11	CERAMIC CHIP 0.0033uF 10%	50V
C958	1-104-916-11	TANTAL. CHIP 6.8uF 20%	20V
C959	1-164-227-11	CERAMIC CHIP 0.022uF 10%	25V
C960	1-164-227-11	CERAMIC CHIP 0.022uF 10%	25V
C961	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C963	1-104-913-11	TANTAL. CHIP 10uF 20%	16V
C964	1-164-836-11	CERAMIC CHIP 6.8uF	16V
C966	1-165-128-11	CERAMIC CHIP 0.22uF	16V
C969	1-163-018-00	CERAMIC CHIP 0.0056uF 5%	50V
C970	1-163-018-00	CERAMIC CHIP 0.0056uF 5%	50V
C971	1-163-038-91	CERAMIC CHIP 0.1uF	25V
C972	1-135-177-21	TANTALUM CHIP 1uF 20%	20V
C973	1-162-921-11	CERAMIC CHIP 33PF 5%	50V
C974	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C975	1-135-201-11	TANTALUM CHIP 10uF 20%	4V
C976	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C977	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C978	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C979	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C980	1-164-505-11	CERAMIC CHIP 2.2uF	16V
C981	1-162-923-11	CERAMIC CHIP 47PF 5%	50V
		< CONNECTOR >	
CN951	1-580-789-21	PIN, CONNECTOR (SMD) 6P	
CN953	1-573-351-11	CONNECTOR, FFC/FPC 11P	
* CN955	1-580-267-11	CONNECTOR, BOARD TO BOARD 20P	
		< DIODE >	
D951	8-719-043-70	DIODE MA6S121	
D952	8-719-404-19	DIODE LN1251C (TALLY)	
D954	8-719-802-36	DIODE 1SS250	
D955	8-719-820-41	DIODE 1SS302	
D956	8-719-027-45	DIODE MA740	
D957	8-719-027-45	DIODE MA740	
D958	8-719-420-14	DIODE MA8082-M	
D959	8-719-420-14	DIODE MA8082-M	
D960	8-719-420-14	DIODE MA8082-M	
		< IC >	
IC951	8-759-097-75	IC MB3789PFV-G-BND-ER	
IC952	8-759-070-51	IC SN74HCU04ADB	
IC954	8-759-998-98	IC LM358D	
		< COIL >	
L951	1-414-080-11	INDUCTOR 22uH	
L952	1-412-029-11	INDUCTOR CHIP 10uH	
L953	1-412-030-11	INDUCTOR CHIP 22uH	
		< TRANSISTOR >	
Q951	8-729-929-24	TRANSISTOR DTC143TE	
⚠Q953	8-729-024-60	TRANSISTOR MTD6N15T4	
Q954	8-729-928-54	TRANSISTOR DTA123JE	
		< RESISTOR >	
R951	1-218-971-11	METAL GLAZE 33K 5% 1/16W	
R953	1-218-981-11	METAL GLAZE 220K 5% 1/16W	
R954	1-218-975-11	METAL GLAZE 68K 5% 1/16W	
R957	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R958	1-218-965-11	METAL GLAZE 10K 5% 1/16W	
R959	1-218-899-11	METAL CHIP 150K 0.50% 1/16W	
R960	1-218-901-11	METAL CHIP 180K 0.50% 1/16W	
R961	1-218-982-11	METAL GLAZE 270K 5% 1/16W	
R962	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R963	1-218-970-11	METAL GLAZE 27K 5% 1/16W	
R965	1-218-975-11	METAL GLAZE 68K 5% 1/16W	
R966	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R967	1-218-903-11	METAL CHIP 220K 0.50% 1/16W	
R968	1-218-899-11	METAL CHIP 150K 0.50% 1/16W	
R970	1-218-980-11	METAL GLAZE 180K 5% 1/16W	
R971	1-218-970-11	METAL GLAZE 27K 5% 1/16W	
R973	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R974	1-216-849-11	METAL CHIP 220K 5% 1/16W	
R975	1-216-846-11	METAL CHIP 120K 5% 1/16W	
R978	1-218-969-11	METAL GLAZE 22K 5% 1/16W	
R979	1-218-961-11	METAL GLAZE 4.7K 5% 1/16W	
R980	1-218-936-11	METAL GLAZE 39 5% 1/16W	
R981	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R982	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R983	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R984	1-216-835-11	METAL CHIP 15K 5% 1/16W	
R985	1-216-833-11	METAL CHIP 10K 5% 1/16W	
R986	1-216-830-11	METAL CHIP 5.6K 5% 1/16W	
R987	1-216-295-91	CONDCTOR, CHIP (2012)	
R991	1-216-296-00	METAL CHIP 0 5% 1/8W	
R997	1-218-973-11	METAL GLAZE 47K 5% 1/16W	
R998	1-218-977-11	METAL GLAZE 100K 5% 1/16W	
		< VARIABLE RESISTOR >	
RV951	1-241-480-11	RES, ADJ, CERMET 47K	
RV953	1-230-523-11	RES, ADJ, METAL 10K (BRIGHT)	
RV954	1-230-523-11	RES, ADJ, METAL 10K (COLOR)	
RV955	1-230-523-11	RES, ADJ, METAL 10K (HUE)	
		< TRANSFORMER >	
⚠T951	1-423-813-11	TRANSFORMER, INVERTER	

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The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description			Remark
*	A-7066-310-A	VS-123 (SL) BOARD, COMPLETE (FX240)			
		************************************			
*	A-7066-318-A	VS-123 (SLC) BOARD, COMPLETE (FX340)			
		*************************************			
		(Ref. No. 10,000 Series)			

< CAPACITOR >

Ref.No.	Part No.	Description			Remark
C101	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C102	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C106	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C107	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C108	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C109	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C110	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C111	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C112	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C113	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C114	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C115	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C116	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C117	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C118	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C119	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C120	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C121	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C122	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C123	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C124	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C128	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C131	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C134	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C136	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C137	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C143	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C144	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C145	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V
C146	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C147	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C148	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C149	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C150	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C151	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C152	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C154	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C157	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C158	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C159	1-162-922-11	CERAMIC CHIP	39PF	5%	50V
C160	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C161	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C163	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C164	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C165	1-162-956-11	CERAMIC CHIP	180PF	5%	50V
C166	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C167	1-164-382-11	CERAMIC CHIP	91PF	5%	50V
C168	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C169	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C172	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C179	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C190	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C204	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C205	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C206	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C207	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C208	1-128-007-11	ELECT CHIP	2.2uF	20%	35V
C209	1-126-246-11	ELECT CHIP	220uF	20%	4V
C210	1-162-961-11	CERAMIC CHIP	330PF	10%	50V
C211	1-128-013-11	ELECT CHIP	1uF	20%	50V
C212	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C213	1-135-176-21	TANTALUM CHIP	0.68uF	10%	20V
C214	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C215	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C216	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C217	1-128-013-11	ELECT CHIP	1uF	20%	50V
C218	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C219	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C220	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C222	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C225	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C226	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C227	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C228	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C229	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C230	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C231	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C232	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C234	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C235	1-126-207-11	ELECT CHIP	33uF	20%	4V
C238	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C239	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C240	1-164-392-11	CERAMIC CHIP	390PF	5%	50V
C241	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C242	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C243	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C244	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C245	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C247	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C251	1-162-956-11	CERAMIC CHIP	180PF	5%	50V
C258	1-164-346-11	CERAMIC CHIP	1uF		16V
C262	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C263	1-162-974-11	CERAMIC CHIP	0.01uF		50V

VS-123

Ref. No.	Part No.	Description			Remark
C264	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C268	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C271	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C273	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C274	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C275	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C276	1-162-944-11	CERAMIC CHIP	18PF	5%	50V
C278	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C279	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C281	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C282	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C284	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C285	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C286	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C287	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C289	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C290	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C291	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C299	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C301	1-128-004-11	ELECT CHIP	10uF	20%	16V
C305	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C307	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C310	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C312	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C319	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C320	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C328	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C331	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C334	1-162-935-11	CERAMIC CHIP	4PF	0.25PF	50V
C500	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C501	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C502	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C503	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C504	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C506	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C507	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C508	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C509	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C510	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C511	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C512	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C513	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C514	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C515	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C516	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C518	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C519	1-164-346-11	CERAMIC CHIP	1uF		16V
C521	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C522	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C523	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V

Ref. No.	Part No.	Description			Remark
C524	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
C525	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C526	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C527	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C528	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C529	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C530	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C531	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C532	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C533	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C534	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C535	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C536	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C537	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C539	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C540	1-162-913-11	CERAMIC CHIP	8PF	0.5PF	50V
C541	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C543	1-162-913-11	CERAMIC CHIP	8PF	0.5PF	50V
C544	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C545	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C546	1-164-346-11	CERAMIC CHIP	1uF		16V
C547	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C548	1-128-004-11	ELECT CHIP	10uF	20%	16V
C550	1-128-530-11	ELECT CHIP	33uF	20%	10V
C559	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C560	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C561	1-128-004-11	ELECT CHIP	10uF	20%	16V
C562	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C563	1-164-816-11	CERAMIC CHIP	220PF	2%	50V
C564	1-164-816-11	CERAMIC CHIP	220PF	2%	50V
C565	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C566	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C567	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C568	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C569	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C570	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C571	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C573	1-162-909-11	CERAMIC CHIP	4PF	0.25PF	50V
C951	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C955	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C957	1-162-962-11	CERAMIC CHIP	470PF	10%	50V (FX340)
C958	1-164-360-11	CERAMIC CHIP	0.1uF		16V (FX340)
C959	1-135-201-11	TANTALUM CHIP	10uF	20%	4V (FX340)
C967	1-165-128-11	CERAMIC CHIP	0.22uF		16V
		< CONNECTOR >			
CN101	1-691-492-21	CONNECTOR, FFC/FPC 13P			

Ref. No.	Part No.	Description	Remark
CN102	1-580-789-21	PIN, CONNECTOR (SMD) 6P	
CN201	1-573-353-11	CONNECTOR, FFC/FPC 13P	
CN202	1-691-536-11	CONNECTOR, BOARD TO BOARD 24P	
* CN203	1-764-396-21	CONNECTOR, BOARD TO BOARD 42P	
CN206	1-580-789-21	PIN, CONNECTOR (SMD) 6P	
CN502	1-764-708-11	CONNECTOR, FFC/FPC (LIF) 9P	
CN503	1-764-717-11	CONNECTOR, FFC/FPC (LIF) 18P	
CN504	1-695-325-11	CONNECTOR, BOARD TO BOARD 42P	
* CN505	1-764-397-21	CONNECTOR, BOARD TO BOARD 42P	
		< DIODE >	
D101	8-719-800-76	DIODE 1SS226	
D102	8-719-404-49	DIODE MA111	
D201	8-719-027-50	DIODE MA142WK	
D204	8-719-027-50	DIODE MA142WK	
D212	8-719-404-49	DIODE MA111	
D218	8-719-800-76	DIODE 1SS226	
D321	8-719-045-87	DIODE MA4Z082WA	
⚠D501	8-719-421-27	DIODE MA728	
D504	8-719-404-49	DIODE MA111	
D505	8-719-404-49	DIODE MA111	
		< FILTER >	
FL201	1-236-757-21	FILTER, LOW PASS (C)	
		< IC >	
IC102	8-752-069-78	IC CXA1704R	
IC201	8-752-068-58	IC CXA1700R	
IC203	8-752-351-22	IC CXL5502N	
IC205	8-752-053-21	IC CXA1211M	
IC501	8-759-278-57	IC AK6420HF-E2	
IC502	8-759-295-62	IC S-8423DFS-T2	
IC503	8-759-267-67	IC MB89098PFV-G-107-BND	
IC505	8-752-851-37	IC CXP87132-009R	
IC506	8-759-169-11	IC CXA1575M-E2	
IC508	8-759-195-09	IC XR1083CQ-E2	
IC951	8-759-169-02	IC MB88344BPFV-G-BND-ER	
IC953	8-759-710-29	IC NJM2235M (FX340)	
		< COIL >	
L103	1-412-066-21	INDUCTOR CHIP 220uH	
L104	1-412-951-11	INDUCTOR 10uH	
L105	1-412-066-21	INDUCTOR CHIP 220uH	
L108	1-412-060-11	INDUCTOR CHIP 22uH	
L109	1-412-957-11	INDUCTOR 33uH	
L110	1-410-657-21	INDUCTOR CHIP 180uH	
L111	1-412-950-11	INDUCTOR 8.2uH	
L112	1-412-280-31	INDUCTOR 330uH	
L113	1-412-957-11	INDUCTOR 33uH	
L114	1-412-282-41	INDUCTOR 470uH	

Ref. No.	Part No.	Description	Remark
L115	1-412-280-31	INDUCTOR 330uH	
L116	1-410-657-21	INDUCTOR CHIP 180uH	
L118	1-410-655-31	INDUCTOR CHIP 120uH	
L120	1-412-951-11	INDUCTOR 10uH	
L203	1-412-955-11	INDUCTOR 22uH	
L204	1-412-963-11	INDUCTOR 100uH	
L207	1-412-945-11	INDUCTOR 3.3uH	
L209	1-412-960-21	INDUCTOR 56uH	
L213	1-412-953-11	INDUCTOR 15uH	
L214	1-412-962-11	INDUCTOR 82uH	
L503	1-412-961-11	INDUCTOR 68uH	
		< IC LINK >	
⚠PS500	1-576-122-21	LINK, IC (CCP2E10 0.4A)	
⚠PS501	1-576-122-21	LINK, IC (CCP2E10 0.4A)	
		< TRANSISTOR >	
Q101	8-729-905-23	TRANSISTOR 2SA1576-R	
Q102	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q103	8-729-216-22	TRANSISTOR 2SA1162	
Q104	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q105	8-729-402-42	TRANSISTOR UN5213	
Q106	8-729-402-42	TRANSISTOR UN5213	
Q109	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q111	8-729-015-74	TRANSISTOR UN5111	
Q112	8-729-117-73	TRANSISTOR 2SC4178-F14	
Q113	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q114	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q115	8-729-012-50	TRANSISTOR 2SC4400-3/4/5	
Q117	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q119	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q126	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q129	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q132	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q133	8-729-012-50	TRANSISTOR 2SC4400-3/4/5	
Q134	8-729-402-48	TRANSISTOR UN521E	
Q135	8-729-402-48	TRANSISTOR UN521E	
Q202	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q204	8-729-402-42	TRANSISTOR UN5213	
Q216	8-729-402-42	TRANSISTOR UN5213	
Q217	8-729-420-12	TRANSISTOR XN4213	
Q219	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q225	8-729-015-76	TRANSISTOR UN5211	
Q232	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q234	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q235	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
Q236	8-729-230-63	TRANSISTOR 2SC4116-YG	
Q237	8-729-402-81	TRANSISTOR XN4501	
Q238	8-729-420-50	TRANSISTOR UN5215	
Q240	8-729-230-63	TRANSISTOR 2SC4116-YG	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description				Remark
Q242	8-729-420-24	TRANSISTOR	2SB1218A-QRS			
Q244	8-729-402-42	TRANSISTOR	UN5213			
Q246	8-729-402-81	TRANSISTOR	XN4501			
Q247	8-729-402-42	TRANSISTOR	UN5213			
Q252	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q253	8-729-420-56	TRANSISTOR	UN511E			
Q254	8-729-403-35	TRANSISTOR	UN5113			
Q256	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q257	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q258	8-729-420-24	TRANSISTOR	2SB1218A-QRS			
Q259	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q260	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q261	8-729-402-42	TRANSISTOR	UN5213			
Q262	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q263	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q264	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q266	8-729-402-42	TRANSISTOR	UN5213			
Q267	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q268	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q501	8-729-403-27	TRANSISTOR	XN4401			
Q503	8-729-402-81	TRANSISTOR	XN4501			
Q504	8-729-120-28	TRANSISTOR	2SC1623-L5L6			
Q506	8-729-402-42	TRANSISTOR	UN5213			
Q507	8-729-120-28	TRANSISTOR	2SC1623-L5L6			
Q511	8-729-420-20	TRANSISTOR	XN4312			
Q951	8-729-101-07	TRANSISTOR	2SB798-DL			
Q952	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q954	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q955	8-729-230-63	TRANSISTOR	2SC4116-YG (FX340)			
Q956	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q958	8-729-230-63	TRANSISTOR	2SC4116-YG			
		< RESISTOR >				
R101	1-216-864-11	METAL CHIP	0	5%	1/16W	
R102	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R103	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R104	1-216-819-11	METAL CHIP	680	5%	1/16W	
R105	1-216-819-11	METAL CHIP	680	5%	1/16W	
R106	1-216-814-11	METAL CHIP	270	5%	1/16W	
R107	1-216-813-11	METAL CHIP	220	5%	1/16W	
R108	1-216-800-11	METAL GLAZE	18	5%	1/16W	
R109	1-216-804-11	METAL CHIP	39	5%	1/16W	
R110	1-216-818-11	METAL CHIP	560	5%	1/16W	
R111	1-218-875-11	METAL CHIP	15K	0.50%	1/16W	
R112	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R114	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R118	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R119	1-216-864-11	METAL CHIP	0	5%	1/16W	
R120	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R122	1-216-853-11	METAL CHIP	470K	5%	1/16W	

Ref.No.	Part No.	Description				Remark
R123	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R124	1-216-864-11	METAL CHIP	0	5%	1/16W	
R126	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R127	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R128	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R130	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R132	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R133	1-216-819-11	METAL CHIP	680	5%	1/16W	
R134	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R135	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R136	1-216-820-11	METAL CHIP	820	5%	1/16W	
R137	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R140	1-216-813-11	METAL CHIP	220	5%	1/16W	
R141	1-216-817-11	METAL CHIP	470	5%	1/16W	
R142	1-216-818-11	METAL CHIP	560	5%	1/16W	
R143	1-216-808-11	METAL CHIP	82	5%	1/16W	
R144	1-216-818-11	METAL CHIP	560	5%	1/16W	
R146	1-216-809-11	METAL CHIP	100	5%	1/16W	
R147	1-216-864-11	METAL CHIP	0	5%	1/16W	
R148	1-216-813-11	METAL CHIP	220	5%	1/16W	
R149	1-216-813-11	METAL CHIP	220	5%	1/16W	
R150	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R151	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R152	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R153	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R154	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R158	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R159	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R160	1-216-818-11	METAL CHIP	560	5%	1/16W	
R162	1-216-818-11	METAL CHIP	560	5%	1/16W	
R163	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R164	1-216-864-11	METAL CHIP	0	5%	1/16W	
R165	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R166	1-216-816-11	METAL CHIP	390	5%	1/16W	
R171	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R173	1-216-864-11	METAL CHIP	0	5%	1/16W	
R174	1-216-864-11	METAL CHIP	0	5%	1/16W	
R175	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R178	1-216-809-11	METAL CHIP	100	5%	1/16W	
R179	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R180	1-216-809-11	METAL CHIP	100	5%	1/16W	
R181	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R185	1-216-847-11	METAL CHIP	150K	5%	1/16W	
R186	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R187	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R188	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R189	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R193	1-216-815-11	METAL CHIP	330	5%	1/16W	
R194	1-216-818-11	METAL CHIP	560	5%	1/16W	
R195	1-216-839-11	METAL CHIP	33K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R196	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R197	1-216-864-11	METAL CHIP	0	5%	1/16W	
R201	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R202	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R203	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R204	1-216-864-11	METAL CHIP	0	5%	1/16W	
R205	1-216-864-11	METAL CHIP	0	5%	1/16W	
R207	1-216-804-11	METAL CHIP	39	5%	1/16W	
R209	1-216-814-11	METAL CHIP	270	5%	1/16W	
R210	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R211	1-216-803-11	METAL CHIP	33	5%	1/16W	
R212	1-216-864-11	METAL CHIP	0	5%	1/16W	
R213	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R214	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R215	1-216-819-11	METAL CHIP	680	5%	1/16W	
R216	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R218	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R219	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R220	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	(FX340)
R221	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R222	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	(FX340)
R223	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R224	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R226	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R228	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R229	1-216-864-11	METAL CHIP	0	5%	1/16W	
R230	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R231	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R232	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R233	1-216-809-11	METAL CHIP	100	5%	1/16W	
R234	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R235	1-218-877-11	METAL CHIP	18K	0.50%	1/16W	
R236	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R241	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R245	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R246	1-216-819-11	METAL CHIP	680	5%	1/16W	
R247	1-216-815-11	METAL CHIP	330	5%	1/16W	
R253	1-218-849-11	METAL CHIP	1.2K	0.50%	1/16W	
R255	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R256	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R259	1-218-859-11	METAL CHIP	3.3K	0.50%	1/16W	
R261	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R263	1-218-839-11	METAL GLAZE	470	0.50%	1/16W	
R265	1-216-818-11	METAL CHIP	560	5%	1/16W	
R272	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R273	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R274	1-216-864-11	METAL CHIP	0	5%	1/16W	
R279	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R283	1-216-864-11	METAL CHIP	0	5%	1/16W	
R285	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R286	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R288	1-216-844-11	METAL CHIP	82K	5%	1/16W	
R289	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R290	1-216-864-11	METAL CHIP	0	5%	1/16W	
R291	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R295	1-216-864-11	METAL CHIP	0	5%	1/16W	
R296	1-216-815-11	METAL CHIP	330	5%	1/16W	
R297	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R300	1-216-817-11	METAL CHIP	470	5%	1/16W	
R302	1-216-864-11	METAL CHIP	0	5%	1/16W	
R303	1-216-810-11	METAL CHIP	120	5%	1/16W	
R304	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R305	1-216-820-11	METAL CHIP	820	5%	1/16W	
R307	1-216-813-11	METAL CHIP	220	5%	1/16W	
R308	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R309	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R311	1-216-864-11	METAL CHIP	0	5%	1/16W	
R312	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R313	1-216-817-11	METAL CHIP	470	5%	1/16W	
R314	1-216-864-11	METAL CHIP	0	5%	1/16W	
R315	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R316	1-216-815-11	METAL CHIP	330	5%	1/16W	
R317	1-216-820-11	METAL CHIP	820	5%	1/16W	
R318	1-216-820-11	METAL CHIP	820	5%	1/16W	
R319	1-216-818-11	METAL CHIP	560	5%	1/16W	
R321	1-216-813-11	METAL CHIP	220	5%	1/16W	
R322	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R323	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R324	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R325	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R328	1-216-820-11	METAL CHIP	820	5%	1/16W	
R331	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R332	1-216-864-11	METAL CHIP	0	5%	1/16W	
R333	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R334	1-216-815-11	METAL CHIP	330	5%	1/16W	
R338	1-216-812-11	METAL CHIP	180	5%	1/16W	
R339	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R342	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R347	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R348	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R349	1-216-864-11	METAL CHIP	0	5%	1/16W	
R354	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R357	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R364	1-216-864-11	METAL CHIP	0	5%	1/16W	
R366	1-216-864-11	METAL CHIP	0	5%	1/16W	
R368	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R373	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R383	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R387	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R395	1-216-864-11	METAL CHIP	0	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R398	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R399	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R500	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R501	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R502	1-216-295-91	CONDCTOR, CHIP	(2012)			
R503	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R505	1-216-864-11	METAL CHIP	0	5%	1/16W	
R506	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R507	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R508	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R509	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R510	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R511	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R512	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R513	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R514	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R515	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R516	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R517	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R518	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R519	1-216-817-11	METAL CHIP	470	5%	1/16W	
R520	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R522	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R523	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R525	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R526	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R527	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R528	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R529	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R530	1-216-019-00	METAL CHIP	56	5%	1/10W	
R531	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R532	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R533	1-217-671-11	METAL CHIP	1	5%	1/10W	
R534	1-217-671-11	METAL CHIP	1	5%	1/10W	
R535	1-217-671-11	METAL CHIP	1	5%	1/10W	
R536	1-217-671-11	METAL CHIP	1	5%	1/10W	
R537	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R538	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R539	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R540	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R541	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R542	1-216-864-11	METAL CHIP	0	5%	1/16W	
R543	1-216-864-11	METAL CHIP	0	5%	1/16W	
R544	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R546	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R548	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R549	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R552	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R553	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R555	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R556	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R558	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R560	1-216-296-00	METAL CHIP	0	5%	1/8W	
R561	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R562	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R563	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R565	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R566	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R567	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R569	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R570	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R572	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R573	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R577	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R578	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R579	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R580	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R581	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R582	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R583	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R584	1-216-864-11	METAL CHIP	0	5%	1/16W	
R585	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R586	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R587	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R588	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R589	1-216-864-11	METAL CHIP	0	5%	1/16W	
R590	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R591	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R592	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R593	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R594	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R595	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R596	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R597	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R599	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R951	1-216-864-11	METAL CHIP	0	5%	1/16W	
R952	1-216-864-11	METAL CHIP	0	5%	1/16W	
R954	1-216-138-00	METAL CHIP	3.3	5%	1/8W	
R955	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R956	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R957	1-216-820-11	METAL CHIP	820	5%	1/16W	
R960	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R962	1-216-840-11	METAL CHIP	39K	5%	1/16W	(FX340)
R963	1-216-839-11	METAL CHIP	33K	5%	1/16W	(FX340)
R964	1-216-839-11	METAL CHIP	33K	5%	1/16W	(FX340)
R965	1-216-840-11	METAL CHIP	39K	5%	1/16W	(FX340)
R966	1-216-864-11	METAL CHIP	0	5%	1/16W	(FX240)
R967	1-216-847-11	METAL CHIP	150K	5%	1/16W	(FX340)
R968	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	(FX340)
R988	1-216-821-11	METAL CHIP	1K	5%	1/16W	(FX340)

Ref.No.	Part No.	Description	Remark
R989	1-216-829-11	METAL CHIP 4.7K 5% 1/16W	
R990	1-216-837-11	METAL CHIP 22K 5% 1/16W	
R991	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R992	1-216-825-11	METAL CHIP 2.2K 5% 1/16W	
R993	1-216-821-11	METAL CHIP 1K 5% 1/16W	
R994	1-216-834-11	METAL CHIP 12K 5% 1/16W	
R995	1-216-817-11	METAL CHIP 470 5% 1/16W	
R996	1-216-843-11	METAL CHIP 68K 5% 1/16W	(FX240)
R1400	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1401	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1403	1-216-845-11	METAL CHIP 100K 5% 1/16W	
R1404	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R1406	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1408	1-216-857-11	METAL CHIP 1M 5% 1/16W	
R1412	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1413	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1414	1-216-864-11	METAL CHIP 0 5% 1/16W	
R1415	1-216-864-11	METAL CHIP 0 5% 1/16W	
R2009	1-216-864-11	METAL CHIP 0 5% 1/16W	(FX340)
		< COMPOSITION CIRCUIT BLOCK >	
RB501	1-236-432-11	NETWORK, RES 47K	
RB502	1-236-971-11	NETWORK, RES 0	
RB503	1-236-432-11	NETWORK, RES 47K	
RB504	1-236-412-11	NETWORK, RES 1.0K	
RB505	1-236-412-11	NETWORK, RES 1.0K	
RB506	1-236-412-11	NETWORK, RES 1.0K	
RB510	1-236-412-11	NETWORK, RES 1.0K	
RB512	1-236-412-11	NETWORK, RES 1.0K	
RB513	1-236-971-11	NETWORK, RES 0	
RB515	1-236-904-11	NETWORK, RES 1K	
RB516	1-236-904-11	NETWORK, RES 1K	
RB518	1-236-971-11	NETWORK, RES 0	
RB519	1-236-971-11	NETWORK, RES 0	
RB520	1-236-904-11	NETWORK, RES 10K	
RB523	1-236-432-11	NETWORK, RES 47K	
RB524	1-236-908-11	NETWORK, RES 10K	
RB525	1-236-424-11	NETWORK, RES 10K	
RB526	1-236-908-11	NETWORK, RES 10K	
RB527	1-236-424-11	NETWORK, RES 10K	
RB528	1-236-424-11	NETWORK, RES 10K	
RB529	1-236-424-11	NETWORK, RES 10K	
RB530	1-236-424-11	NETWORK, RES 10K	
RB531	1-236-424-11	NETWORK, RES 10K	
RB532	1-236-424-11	NETWORK, RES 10K	
RB535	1-236-908-11	NETWORK, RES 10K	
RB536	1-236-412-11	NETWORK, RES 1.0K	
RB537	1-236-412-11	NETWORK, RES 1.0K	
RB542	1-236-412-11	NETWORK, RES 1.0K	
RB543	1-236-412-11	NETWORK, RES 1.0K	

Ref.No.	Part No.	Description	Remark
RB544	1-236-412-11	NETWORK, RES 1.0K	
RB549	1-236-971-11	NETWORK, RES 0	
RB550	1-236-971-11	NETWORK, RES 0	
RB552	1-236-412-11	NETWORK, RES 1.0K	
RB554	1-236-971-11	NETWORK, RES 0	
RB555	1-236-971-11	NETWORK, RES 0	
		< VARIABLE RESISTOR >	
RV202	1-238-086-11	RES, ADJ, CERMET 470	
		< VIBRATOR >	
X201	1-579-365-21	VIBRATOR, CRYSTAL (3.58MHz)	
X501	1-579-049-21	VIBRATOR, CRYSTAL (32kHz)	
X502	1-760-314-11	VIBRATOR, CRYSTAL (11.895MHz)	
		< VIBRAOTR >	
XTL501	1-579-369-21	VIBRATOR (10MHz)	

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* A-7072-173-A ZB-2 (SL) BOARD, COMPLETE
****
(Ref. No. 3,000 Series)

Ref.No.	Part No.	Description	Remark
		< CONNECTOR >	
CN101	1-691-483-21	CONNECTOR, FFC/FPC 4P	
		< BATTERY HOLDER >	
LI101	1-550-104-11	HOLDER, BATTERY	

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MISCELLANEOUS
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Ref.No.	Part No.	Description	Remark
105	1-467-648-21	SWITCH BLOCK, CONTROL (CK)	
⚠158	1-452-566-11	CRT ASSY (M01KKX07WB10)(FX240)	
215	1-643-806-11	FP-539 FLEXIBLE BOARD (FX340)	
251	1-467-649-11	SWITCH BLOCK, CONTROL (FK)(FX340)	
251	1-467-649-81	SWITCH BLOCK, CONTROL (FK)(FX240)	
257	1-691-471-11	CONNECTOR, TRANSLATION 11P	
261	1-651-935-11	FP-95 FLEXIBLE BOARD	
269	1-651-936-11	FP-96 FLEXIBLE BOARD	
303	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
303	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	
303	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
304	1-651-904-81	FP-97 FLEXIBLE BOARD	
314	1-547-558-21	FILTER BLOCK, OPTICAL	
351	8-848-704-01	DEVICE, LENS LSV-140A (TYPE I)	
401	1-547-716-11	LENS, ZOOM (VCL-5412WA)(TYPE II)	
451	1-547-739-11	LENS, ZOOM (VCL-5412WB)(TYPE III)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
801	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
807	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
871	1-641-643-12	FP-444 FLEXIBLE BOARD	
872	1-691-254-13	CONNECTOR, TRANSLATION 10P	
874	1-641-639-13	FP-442 FLEXIBLE BOARD	
875	1-645-271-11	FP-575 FLEXIBLE BOARD	
BL951	1-519-746-21	TUBE, FLUORESCENT (0.7 INCH)(FX340)	
D802	8-719-984-02	LED BR4371F (TALLY)(FX340)	
IC691	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE)(CCD IMAGER)	
J201	1-537-726-11	TERMINAL BOARD	
LCD901	8-753-011-00	LCX003BK-1 (FX340)	
M001	1-542-162-11	MICROPHONE, CAP	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	
M905	1-698-364-01	MOTOR ASSY, FOCUS	
M906	1-698-363-01	MOTOR ASSY, ZOOM	
M907	3-708-888-01	METER, IG (IRIS)	
M908	3-708-889-01	MOTOR ASSY, FOCUS	
M909	3-708-887-01	MOTOR ASSY, ZOOM	
M910	3-708-898-01	IRIS ASSY	
M911	3-708-897-01	MOTOR ASSY, FOCUS	
M912	3-708-896-01	MOTOR ASSY, ZOOM	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (REC PROOF, ME/MP, MP/MP-HG)	
S005	1-570-771-21	SWITCH (C DOWN)	
W500	1-651-889-11	FP-48 FLEXIBLE BOARD	
W501	1-642-186-11	FP-437 FLEXIBLE BOARD	
W502	1-526-978-51	SOCKET ASSY, CRT (FX240)	

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ACCESSORIES & PACKING MATERIALS
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Ref.No.	Part No.	Description	Remark
	1-467-574-21	REMOTE COMMANDER (RMT-708)	
	1-574-039-11	CORD CONNECTION (A/V connecting cable)(monaural))(1.5m)	
	3-798-592-21	MANUAL INSTRUCTION (ENGLISH)	
	3-896-108-01	BAG, PROTECTION	
	3-947-969-21	BELT (S), SHOULDER	
	3-958-131-01	LID, BATTERY CASE (for RMT-708)	
*	3-958-571-01	CUSHION, LOWER	
*	3-958-572-01	CUSHION, ACC	
*	3-962-863-01	INDIVIDUAL CARTON (FX240)	
*	3-962-863-11	INDIVIDUAL CARTON (FX340)	
**	AC-V25A/25B/25C	AC POWER ADAPTOR	
***	NP-55	BATTERY PACK	

Note.

** MARK PARTS IS AVAILABLE FOR REPAIR SERVICE.
*** MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.

Be sure to read "Note on the CCD Imager replacement" on page 4–5 when changing the CCD imager.

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HARDWARE LIST
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Ref.No.	Part No.	Description	Remark
#1	7-627-553-47	PRECISION SCREW +P 2X4 TYPE 3	

SECTION 6

INTERFACES • IC PIN FUNCTIONS

6-1. CAMERA CONTROL MICRO PROCESSOR PIN FUNCTION (VC-159 BOARD IC602: SC424614 MC68HC11MA8FU)

Pin No.	Signal Name	I/O	Function
1	VTR SO	I	Serial data input from mode control microprocessor (VS board IC503).
2	$\overline{\text{VTR SCK}}$	I	Serial data transfer clock from/to mode control microprocessor.
3	$\overline{\text{CAM CS}}$	I	Chip select signal from mode control microprocessor.
4			Not used.
5			
6			
7			
8			
9	PBV	I	V sync signal from servo/mechanism control microprocessor (VS board IC505).
10			Not used (connected to +3.6V).
11			
12	VDD		+3.6V power supply.
13	VSS		GND
14	$\overline{\text{CS TG}}$	O	Chip select signal to timing generator (IC702).
15			Not used (connected to +3.6V).
16	START	O	Operation signal of IC705. Normally "L". "H" during operation.
17	WEN	I	Write enable signal from timing generator (IC702). Normally "H".
18			Not used.
19			
20	$\overline{\text{CS CORE}}$	O	Chip select signal to camera core (IC609).
21	EEPROM BUSY	I	BUSY signal from EEPROM (IC601). Normally "H". "L" during data read/write.
22			Not used.
23	IRIS PWM	O	Iris control signal.
24			Not used.
25			
26	$\overline{\text{TESTX}}$	O	Test signal of IC705. "H": Camera mode, "L": Test/VTR mode.
27	LENS RST LED	O	Lens reset sensor LED ON/OFF. "H": ON, "L": OFF.
28	FC RST	I	Lens focus reset sensor signal input.
29	ZM RST	I	Lens zoom reset sensor signal input.
30	XIRQ		Connected to +3.6V.
31	VDD		+3.6V power supply.
32	VSS		GND
33			Not used.
34			
35			
36	$\overline{\text{CAM SCK}}$	O	Serial data transfer clock.
37	CAM SO	O	Serial data output.
38	CAM SI	I	Serial data input.
39			Not used.
40			

Pin No.	Signal Name	I/O	Function
41	VDD		+3.6V power supply.
42	GENERAL A/D	I	Camera core (IC609) discrimination signal input.
43	LENS TYPE	I	Lens type discrimination signal input.
44	ZOOM SW	I	Zoom key signal input. When not pressed: 1.8V, TELE 1: 2.7V, TELE 2: 3.6V, WIDE 1: 0.9V, WIDE 2: 0V.
45			Not used.
46			
47			Not used. Connected to GND.
48			
49	HALL A/D	I	Hall voltage. Approx. 1V (iris opened) to approx. 3.5V (iris closed).
50	VRL	I	Connected to GND.
51	VRH	I	Connected to +3.6V.
52	VSS		GND
53	$\overline{\text{CS EEPROM}}$	O	Chip select signal to EEPROM (IC601).
54	$\overline{\text{CS CAM OPD}}$	O	Chip select signal to OPD (IC611).
55	D/A STB	O	Strobe signal to camera EVR (IC603).
56	EEPROM RESET	O	EEPROM (IC601) write disable signal. Normally "H".
57	$\overline{\text{CS AF OPD}}$	O	Chip select signal to AF OPD (IC611).
58	$\overline{\text{CS PDR}}$	O	Chip select signal to pre-driver (IC753).
59	$\overline{\text{CAM ON}}$	O	A/D converter (IC704) ON/OFF signal. Normally "H".
60	$\overline{\text{NTSC}}$	O	"L": NTSC, "H": PAL.
61	IRQ	I	Connected to +3.6V.
62			Not used.
63			
64	$\overline{\text{PDR RST}}$	O	Reset signal to zoom/focus pre-driver (IC753). "H": Camera mode, "L": VTR mode.
65	$\overline{\text{NRML}}$/VST	O	"H": Steady shot operation, "L": Normal operation.
66	$\overline{\text{VST/CORE RST}}$	O	Reset signal to camera core (IC609). Normally "H". "L": Reset.
67	$\overline{\text{OPD RST}}$	O	Reset signal to IC611 and IC705. "H": Camera mode, "L": VTR mode.
68			Not used. Connected to GND.
69			
70	VSS		GND
71	VDD		+3.6V power supply.
72			Not used.
73	EXTAL	I	24 MHz clock oscillation circuit.
74	XTAL	O	
75	$\overline{\text{RESET}}$	I	Reset signal from mode control microprocessor (VS board IC503). Normally "H". "L": Reset.
76	MODB		Connected to +3.6V.
77	MODA		Connected to GND.
78	RXD		Not used.
79	TXD		
80	VTR SO	O	Serial data output to mode control microprocessor (VS board IC503).

6-2. CAMERA CORE PIN FUNCTION
(VC-159 BOARD IC609: CXD2150R-T6)

Pin No.	Signal Name	I/O	Function	
1	OPD6	O	OPD (IC611) data output.	
2	OPD5	O	OPD data output.	
3	OPD4	O	OPD data output.	
4	OPD3	O	OPD data output.	
5	OPD2	O	OPD data output.	
6	OPD1	O	OPD data output.	
7	OPD0	O	OPD data output, LSB.	
8	OPDID	O	OPD line discrimination signal.	
9	VDD	–	Power supply (+3.6V).	
10	CO3	O	Not used.	
11	CO2	O		
12	CO1	O		
13	CO0	O		
14	VSS	–	GND	
15	CI3	I	Not used.	
16	CI2	I		
17	CI1	I		
18	CI0	I		
19	NRB	O	C signal. Color discrimination signal.	
20	VDD	–	+3.6V power supply.	
21	VBC		Connected to GND via 0.1 μF capacitor.	Chroma signal D/A converter interface.
22	AVSC		GND	
23	IREFC		Connected to GND via 12 kΩ resistor.	
24	VREFC	I	Full scale output value setting voltage.	
25	VGC		Connected to +3.6V power supply via 0.1 μF capacitor.	
26	AVDC		+3.6V power supply.	
27	IOC	O	Chroma signal output (Current output).	
28	VDD	–	Y I/F power supply (+3.6V).	
29	DICK	O	Not used.	
30	CDIS	O		
31	YO7	O		
32	YO6	O		
33	YO5	O		
34	YO4	O		
35	YO3	O		
36	YO2	O		
37	YO1	O		
38	YO0	O		
39	DATS	I	DA test pin. (Normally fixed at "L".)	
40	YI7	I	Not used.	

Pin No.	Signal Name	I/O	Function	
41	YI6	I	Not used.	
42	YI5	I		
43	YI4	I		
44	YI3	I		
45	YI2	I		
46	YI1	I		
47	YI0	I		
48	VSS	–	GND	
49	IOY	O	Y signal output (current output).	Y signal D/A converter interface.
50	AVDY		+3.6V power supply.	
51	VGY		Connected to +3.6V power supply via 0.1 μF capacitor.	
52	VRFY	I	Full scale output value setting voltage.	
53	IRFY		Connected to GND via 12 kΩ resistor.	
54	AVSY		GND	
55	VBY		Connected to GND via 0.1 μF capacitor.	
56	VDD	–	+3.6V power supply	
57	BIN	I	Not used.	
58	GIN	I	Not used.	
59	RIN	I	Not used.	
60	TIKEY	I	Not used.	
61	WKEY	I	Wide ID signal input.	
62	VCK	I	PAL 4 fsc modulation clock.	
63	VHLD	I	Mosaic processing vertical hold control signal.	
64	HHLD	I	Mosaic processing horizontal hold control signal.	
65	CSYN	I	Sync signal (SYNC) input.	
66	LALT	I	PAL line modulation inverted signal input.	
67	CBK	I	Blanking signal (CBLK) input.	
68	BF	I	Burst added signal input.	
69	HD	I	Horizontal sync signal (HD) input.	
70	VD	I	Vertical sync signal (VD) input.	
71	AJST	I	Data sampling pulse input.	
72	VDD	–	+3.6V power supply.	
73	SCK	I	Serial interface clock input from camera microprocessor (IC602).	
74	SI	I	Serial interface data input from camera microprocessor.	
75	XCE	I	Serial interface enable input from camera microprocessor.	
76	SO	O	Serial interface data output to camera microprocessor.	
77	VSS	–	GND	
78	CLK	I	Clock input.	
79	DEF	I	Defect compensation position pulse.	
80	ID	I	Color line discrimination signal.	

Pin No.	Signal Name	I/O	Function
81	MCK	I	Main clock input.
82	VDD	–	+3.6V power supply.
83	XCLR	I	All clear input.
84	VDD	–	AD I/F power supply (+3.6V).
85	ADCK	O	AD converter clock output. Not used.
86	VSS	–	GND
87	AD0	I	AD data input from A/D converter (IC704), MSB.
88	AD1	I	AD data input from A/D converter.
89	AD2	I	AD data input from A/D converter.
90	AD3	I	AD data input from A/D converter.
91	AD4	I	AD data input from A/D converter.
92	AD5	I	AD data input from A/D converter.
93	AD6	I	AD data input from A/D converter.
94	AD7	I	AD data input from A/D converter.
95	AD8	I	AD data input from A/D converter.
96	AD9	I	AD data input from A/D converter, LSB.
97	VDD	–	+3.6V power supply.
98	OPD9	O	OPD (IC611) data output, MSB.
99	OPD8	O	OPD data output.
100	OPD7	O	OPD data output.

6-3. MECHANISM CONTROL MICRO PROCESSOR PIN FUNCTION (VS-123 BOARD IC505: CXP87132-009R)

Pin No.	Signal Name	I/O	Function
1	RP PB MODE	O	REC/PB switching signal of REC/PB amplifier (VS board IC102) and ATF servo IC (VS board IC508). "H": PB.
2	$\overline{\text{FE ON}}$	O	Flying erase oscillation on/off control signal. "L": Oscillation.
3	JOG VD	O	False VD signal inserted in playback video signal during variable speed playback.
4	JOG	O	Variable speed playback/normal playback switching signal of video circuit. "H": Variable speed playback.
5	$\overline{\text{S JACK IN}}$	I	
6	$\overline{\text{PB 1.7M DET}}$	I	Not used.
7	JACK MON/$\overline{\text{ST}}$ DET	I	
8	INT VD	O	Internal VD signal.
9	SYSTEM SYNC (PBV)	O	System synchronizing signal.
10	$\overline{\text{SYNC DET}}$	O	Sync detect output. "L" when sync is detect.
11	E/$\overline{\text{L}}$ DET	I	Not used.
12	$\overline{\text{MIC MONO}}$	I	
13	MODE SW 0	I	Mode switch input.
14	MODE SW 1	I	
15	MODE SW 2	I	
16	$\overline{\text{CC DOWN SW}}$	I	Cassette compartment down switch input. "L": down
17	REC PROOF SW	I	Recording-proof switch input. "H": REC prohibition.
18	ME/$\overline{\text{MP}}$ SW	I	ME/$\overline{\text{MP}}$ switch input. "L": MP, "H": ME.
19	Hi8 MP SW	I	Hi8 MP switch input. "H": Hi8 MP, "L": Normal MP or ME.
20	$\overline{\text{LM LIM ON}}$	O	Loading motor limiter on detection signal. Normally "H": "L" when limiter is on.
21	LINE MIX	O	Not used.
22	MX SEL 1	O	
23	MX SEL 2	O	
24	MX ON/OFF	O	
25	COMP REC	O	
26	CAM/$\overline{\text{LINE}}$	O	Camera input/line input switching signal. "H": Camera input. Normally "H".
27	$\overline{\text{WIND}}$	O	Not used.
28	N.C.		
29	UNLOAD	O	Loading motor control signal. When unloading: "H" or "H" pulse.
30	LOAD	O	Loading motor control signal. When loading: "H" or "H" pulse.
31	$\overline{\text{LM LIM CONT}}$	O	Loading motor limiter control signal. Momentarily "H" when loading.
32	DRUM ON	O	Drum motor on/off signal. "H" (Approx. 1.3V): Drum on.
33	DRUM RVS	O	Drum rotation direction control signal. Normally "L".
34	N.C.		Not used. (open)
35	$\overline{\text{EDIT}}$	O	Not used.
36	E/$\overline{\text{L}}$ OUT	O	
37	MP		Connected to GND.
38	$\overline{\text{RESET}}$	I	Reset signal from mode control micro processor (VS board IC503). When reset: "L". Normally "H".
39	VSS		GND

	BL	END	EJECT	USE	LOAD	READY	TURN	REC/PB	FF
M SW 0	H	L	L	H	L	H	H	L	L
M SW 1	H	H	L	L	L	L	H	H	L
M SW 2	H	H	H	H	H	L	L	L	L

Pin No.	Signal Name	I/O	Function
40	XTAL	O	11.89 MHz clock oscillation circuit.
41	EXTAL	I	
42	MECHA CON $\overline{\text{CS}}$	I	Chip select signal from mode control micro processor (VS board IC503).
43	DATA TO SLAVE	I	Serial data input from mode control micro processor.
44	DATA TO MASTER	O	Serial data output to mode control micro processor.
45	$\overline{\text{MODECON SCK}}$	I	Serial clock input from mode control micro processor.
46	AUDIO MUTE	O	Audio output mute signal. "H": Mute.
47	VIDEO MUTE	O	Video output mute signal. "H": Mute.
48	MONO REC (1.7M $\overline{\text{ON}}$/OFF)	O	Not used.
49	N.C.		
50	AVSS		A/D converter system GND.
51	AVREF		A/D converter system reference voltage. Connected to SS3.6V.
52	AVDD		A/D converter system power supply. Connected to SS3.6V.
53	EXT MIC	I	External microphone discrimination input. Not used.
54	TAPE END SENS	I	Tape end detection signal. Normally: "L", "H" pulse at tape end.
55	TAPE TOP SENS	I	Tape top detection signal. Normally: "L", "H" pulse at tape top.
56	$\overline{\text{DEW DET}}$	I	Condensation detection signal. "L" when condensation present.
57	N.C.		Not used. Connected to GND.
58	ATF ERROR	I	ATF error input.
59	S REEL FG	I	S reel FG signal input.
60	T REEL FG	I	T reel FG signal input.
61	NC		Not used. Connected to GND.
62	CAM VD	I	VD signal from camera circuit sync generator (VC board IC610). V cycle pulse.
63	FLD	I	FIELD signal from camera circuit sync generator.
64	VTR SYNC	I	Composite sync signal separated from recording/playback Y signal.
65		I	Connected to GND.
66	DRUM PG	I	Drum PG signal input. For drum phase servo. 33.3 msec. cycle "H" pulse.
67	DRUM FG	I	Drum FG signal input. For drum speed servo. 2.8 msec. cycle pulse.
68	CAP FG	I	Capstan FG signal input.
69	N.C.	O	Not used.
70	T/E LED ON	O	TAPE LED on/off signal. 200 msec. cycle "H" pulse during REC/PB.
71	SP/$\overline{\text{LP}}$	O	SP/LP switching signal. "L": LP.
72	ME/$\overline{\text{MP}}$ OUT	O	Recording current switching signal. "H": ME tape.
73	CAP PWM	O	Capstan error signal output. PWM signal.
74	DRUM PWM	O	Drum error signal output. PWM signal.
75	CFG HMS	I	Capstan FG signal input.
76	5.9M ATF CLK	O	Clock signal for ATF servo IC (IC508).
77	$\overline{\text{CS TO ATF}}$	O	Chip select signal for ATF servo IC.
78	DATA TO ATF	O	Serial data output to ATF servo IC.
79	$\overline{\text{ATF SCK}}$	O	Serial clock output to ATF servo IC.
80	ATF STBY	O	Standby signal for ATF servo IC.

Pin No.	Signal Name	I/O	Function
81	SP/LP DET	I	Discriminates recording mode.
82	CLOG DET	I	Head clog detection signal. "L": Normal.
83	REF PILOT	O	Reference pilot signal for ATF servo.
84	N.C.		Not used. Connected to GND.
85	N.C.	I	
86	VSS		GND
87	VDD		Connected to SS5V.
88	VPP		
89	DRUM ACC	O	Not used.
90	DRUM BLK	O	Drum motor brake signal. Normally: "L".
91	N.C.		Not used. (open)
92	N.C.	O	
93	VIDEO IN/$\overline{\text{OUT}}$	O	Video input/output switching signal. "H": Video output.
94	AUDIO $\overline{\text{IN}}$/OUT	O	Audio input/output switching signal. "H": Audio output.
95	VA PB MODE	O	REC/PB switching signal of video; audio circuit. "H": PB.
96	VI SWP	O	RF switching pulse signal for video circuit.
97	RF SWP	O	RF switching pulse signal for REC/PB amp and audio circuit.
98	HEAD CHG	O	Not used.
99	CAP ON	O	Capstan driver on/off control signal. "H": Capstan on.
100	CAP FWD/$\overline{\text{RVS}}$	O	Capstan rotation direction control signal. "H": FWD. "L": RVS.

6-4. MODE CONTROL MICRO PROCESSOR PIN FUNCTIONS (VS-123 BOARD IC503: MB89098PFV-G-107-BND)

Pin No.	Signal Name	I/O	Function
1	TEST MODE 0	I	Connected to GND.
2	TEST MODE 1	I	Connected to GND.
3	X0	I	10 MHz clock oscillation circuit.
4	X1	O	
5	VSS		GND
6	$\overline{\text{RESET}}$	I	Reset input.
7	$\overline{\text{DATA SW}}$	I	Date (+) key (CK board S221) input. Normally "H". "L" when key is pressed.
8	$\overline{\text{TIME SW}}$	I	Time key (CK board S222) input. Normally "H". "L" when key is pressed.
9	$\overline{\text{EJECT SW}}$	I	Cassette eject switch (FK board S103) input. Normally "H". "L" when switch is pressed.
10	$\overline{\text{VTR MODE SW}}$	I	Power supply switch (CK board S223) input. "L" when power supply switch is at "Video".
11	$\overline{\text{AGE SW}}$	I	AGE switch (CK board S200) input. "L" when key is pressed.
12	$\overline{\text{START/STOP SW}}$	I	Start/stop key (FK board S102) input. "L" when key is pressed.
13	$\overline{\text{CC DOWN SW}}$	I	CCDOWN switch (mechanism section) input. "L" when cassette compartment is locked.
14	$\overline{\text{CAM+STBY SW}}$	I	Power supply switch (CK board S223), stand-by switch (FK board S101) input. "L" when power supply switch is at "Camera" and stand-by switch at "Standby".
15	BATT IN	I	Main battery detection input. "H" when main battery is loaded or external power supply is connected.
16	PB V	I	System sync signal from mechanism control micro processor (VS board IC505).
17	RF SWP	I	RF switching pulse.
18	$\overline{\text{LANC POWER ON}}$	I	Power on signal input from wired remote commander. "L" when power switch of remote commander is pressed.
19	$\overline{\text{LI PRE END}}$	I	Lithium battery end detection input. "L" when lithium battery has worn out or has not been loaded.
20	$\overline{\text{EEPROM WE}}$	O	EEPROM (VS board IC502) writing enable signal. "L" when writing data.
21			Not used.
22			
23	$\overline{\text{TALLY LED}}$	O	Tally LED on/off signal.
24	$\overline{\text{SYSTEM RESET}}$	O	Reset signal of all systems. Normally "H". "L" when reset.
25	N.C.	O	Not used.
26	CLK 10M/$\overline{\text{32K}}$	I	
27	DATA TO MOC		Not used.
28	N.C.		
29	N.C.		
30	$\overline{\text{SIRCS SIG}}$	I	Infrared remote commander signal input.
31	N.C.		Not used.
32			
33	$\overline{\text{CS EEPROM}}$	O	Chip select signal to EEPROM (VS board IC501).
34	$\overline{\text{CS VIDEO}}$	O	Chip select signal to video IC (VS board IC201).
35	EVF DA STB	O	Not used.
36	$\overline{\text{CS SG}}$	O	Chip select signal to SYNC generator (VC board IC610).
37	CS DA	O	Strobe signal to DA (VS board IC951).
38	$\overline{\text{CS CAM}}$	O	Chip select signal to camera micro processor (VC board IC602).
39	N.C.	O	Not used.
40	N.C.	O	

Pin No.	Signal Name	I/O	Function
41	N.C.		Not used.
42	N.C.		
43	SEG19	O	Not used.
44	SEG18	O	
45	SEG17	O	
46	SEG16	O	
47	VCC		+3.6V power supply (+3V power supply during backup).
48	SEG15	O	Not used.
49	SEG14	O	
50	SEG13	O	
51	SEG12	O	
52	SEG11	O	
53	SEG10	O	
54	SEG09	O	
55	SEG08	O	
56			GND
57	SEG07	O	Not used.
58	SEG06	O	
59	SEG05	O	
60	SEG04	O	
61	SEG03	O	
62	SEG02	O	
63	SEG01	O	
64	SEG00	O	
65	V3	I	3.6V Not used.
66	V2	I	2.4V
67	V1	I	1.2V
68	V0	I	0V
69	COM0	O	Not used.
70	COM1	O	
71	COM2	O	
72	COM3	O	
73	$\overline{\text{CS OSD}}$	O	Chip select signal to character generator (VC board IC614).
74	$\overline{\text{CS MECHA}}$	O	Chip select signal to mechanism control micro processor (VS board IC505).
75	DATA TO MASTER	I	Serial data input signal.
76	DATA TO SLAVE	O	Serial data output signal.
77	$\overline{\text{MODECON SCK}}$	O	Serial data transfer clock.
78	N.C.	O	Not used.
79	VTR DD ON	O	VTR DC-DC converter control signal. "H" when power switch is at "Player" or "Camera".
80	CAM DD ON	O	CAMERA DC-DC converter control signal.
81	AVSS		A/D port GND.

Pin No.	Signal Name	I/O	Function
82	K AD IN 0	I	Key input. A/D port. FF key (FK board S105) REC key (FK board S100, 106) STOP key (FK board S104)
83	K AD IN 1	I	Key input. A/D port. PLAY key (FK board S111) REW key (FK board S110) PAUSE key (FK board S109)
84	K AD IN 2	I	Key input. A/D port. SET key (CK board S204) SELECT (–) key (CK board S203) SELECT (+) key (CK board S202) MENU key (CK board S201)
85	K AD IN 3	I	Key input. A/D port. FADER key (CK board S208) BACK LIGHT key (CK board S207) PROGRAM AE key (CK board S205)
86	K AD IN 4	I	Key input. A/D port. EDIT SEARCH (–) key (CK board) EDIT SEARCH (+) key (CK board) COUNTER RESET key (CK board)
87	N.C.		Not used.
88	N.C.		
89	N.C.		
90	AVCC		A/D port power supply (+3.6V).
91	BATT SENS	I	For main battery voltage input. (Voltage divided into 1/3.14 by R586, R587).
92	N.C.	I	Not used.
93	BRIGHA B	I	
94	BRIGHT B	I	
95	LANC IN	I	LANC serial data input.
96	LANC OUT	O	LANC serial data output.
97	BUZZER	O	Not used.
98	VCC		+3.6V power supply.
99	CL1	O	32 kHz clock oscillation circuit (for clock).
100	CL0	I	

6-5. INTERFACE

6-5-1. System Control – Video/Audio Block Interface (VS-123 BOARD)

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
SP/$\overline{\text{LP}}$	O	IC505 (71)	H	H	H	*2	H	H
VA PB MODE	O	IC505 (95)	L	L	L	H	L	L
AUDIO MUTE *13	O	IC505 ㊻	L	L	L	L	L	L
VIDEO MUTE	O	IC505 ㊼	L	*14	*14	*15	L	L
CAM/$\overline{\text{LINE}}$	O	IC505 ㉖	L	L	L	L	H	H
JOG VD	O	IC505 ③	L	L	L	L	L	L
RP PB MODE	O	IC505 ①	H	H	H	H	H	L
$\overline{\text{FE ON}}$	O	IC505 ②	H	H	H	H	H	L
RF SWP	O	IC505 (97)	L	*7	*7	*7	*7	*7
JOG	O	IC505 ④	L	L	L	L	L	L
$\overline{\text{CS VIDEO}}$	O	IC503 ㉞	V period "L" pulse					
CS DA	O	IC503 ㊲	V period 'H" pulse					
DATA TO SLVE	O	IC503 (76)	V period pulse train					
$\overline{\text{MODECON SCK}}$	I	IC503 (77)	V period pulse train					
SP/$\overline{\text{LP}}$ DET	I	IC505 (81)	L	*10	*10	L	H	H
CLOG DET	I	IC505 (82)	L	*11	*11	*11	*11	H
VTR SYNC	I	IC505 (64)	L	*12	*12	*12	*12	*12
COMP REC	O	IC505 ㉕	L	H	H	L	L	L

*2. Outputs discrimination result of the playback tape.
"H" : SP mode, "L": LP mode.

*7. 30 Hz duty 50% pulse (synchronized with drum rotation)

*10. "H": SP recording area on tape. "L": LP recording area.

*11. "H": no recording area.

*12. Composite sync signal.

*14. "L" when external input (video) present.

*15. "H" when tape no signal.

6-5-2. System Control – Servo Block Interface (VS-123 BOARD)

NAME	I/O	No.	VTR MODE				CAMERA MODE	
			STOP	FF	REW	PB	STAND BY	REC
T.REEL FG	I	IC505 (60)	–	*1	*1	*1	–	*1
S.REEL FG	I	IC505 (59)	–	*1	*1	*1	–	*1
ATF ERROR	I	IC505 (58)	–	*2	*2	*2	*2	*2
DRUM PG	I	IC505 (66)	–	*3	*3	*3	*3	*3
DRUM FG	I	IC505 (67)	–	*4	*4	*4	*4	*4
CAP FG/CFG HMS	I	IC505 (68), (75)	–	*5	*5	*5	*5	*5
CAP ON	O	IC505 (99)	L	H	H	H	L	H
REF PILOT	O	IC505 (83)	*7	*6	*6	*6	*6	*6
RP PB MODE	O	IC505 ①	H	H	H	H	H	L
DRUM RVS *10	O	IC505 ㉝	H	H	H	H	H	H
CAP FWD/$\overline{\text{RVS}}$	O	IC505 (100)	L	H	L	H	L	H
DRUM PWM	O	IC505 (74)	L	*9	*9	*9	*9	*9
CAP PWM	O	IC505 (73)	L	*9	*9	*9	L	*9
$\overline{\text{LM LIM CONT}}$ *11	O	IC505 ㉛	L	L	L	L	L	L
DRUM ON *14	O	IC505 ㉜	L	H	H	H	H	H
DRUM BRK	O	IC505 (90)	L	L	L	L	L	L

*1. Inputting waveform.
*2. ATF error voltage input.
*3. One PG pulse input.
*4. FG pulses input.
*5. FG pulses input.
*6. Four frequencies.
*7. f_1 (102.54 kHz) or f_3 (165.21 kHz) output
*9. PWM signal.
*10. Normally "H".
Temporary "L" when load (drum reverse rotation).
*11. Temporary "H" when cassette loading
(finger catch protection).
*14. "H": approx. 1.3 Vdc.

SECTION 7
ADJUSTMENTS

7-1. CAMERA SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7–28.

1-1. PREPARATIONS BEFORE ADJUSTMENT (CAMERA SECTION)

1-1-1. List of Service Tools

- Oscilloscope
- Adjusting driver
- Regulated power supply
- Color monitor
- Vectorscope
- Digital voltmeter

Ref. No.	Name	Parts Code	Usage
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	White balance check
	ND filter 0.3	J-6080-818-A	White balance check
J-3	Pattern box PTB-450	J-6082-200-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Adjusting remote commander (RM-95-remodeled partly)[Note 1]	J-6082-053-A	
J-6	Siemens star	J-6080-875-A	For checking the flange back
J-7	Extension cable (42P, 0.8 mm)	J-6082-285-A	For extension between the VC-159 board (CN601) and VS-123 board (CN203)
J-8	Extension cable (9P, 0.8 mm)	J-6082-288-A	For extension between the FK board and VS-123 board (CN502)
	Extension cable (18P, 0.8 mm)	J-6080-289-A	For extension between the CK board and VS-123 board (CN503)

Note 1: If the micro processor IC in the adjusting remote commander is not the new micro processor (UPD7503G-C56-12), the pages cannot be switched. In this case, replace with the new micro processor (8-759-148-35).

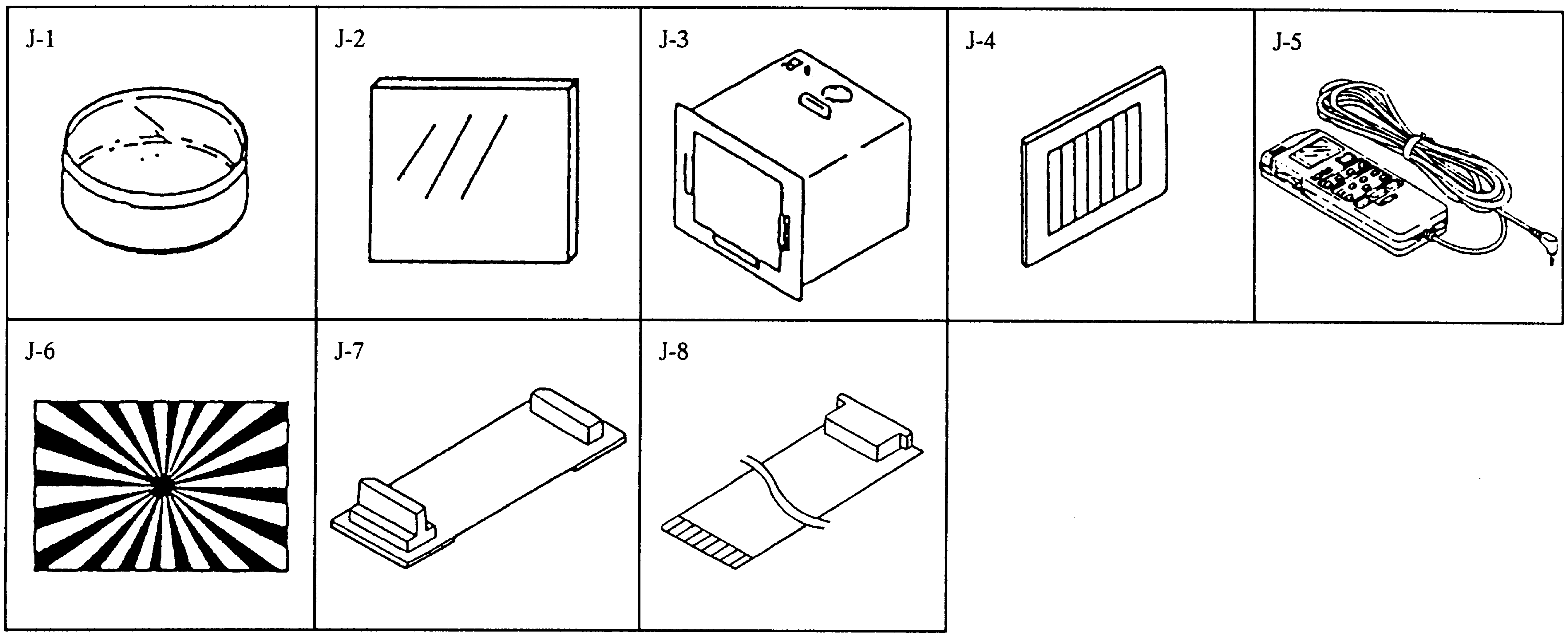


Fig. 7-1-1.

1-1-2. Preparations

Note 1: For further details of how to remove the cabinet and each board, refer to "2. Disassembly".

Note 2: When adjusting only, the lens block and VC-159 board need not be taken apart.

1) Connect the equipments for adjusting as shown in Fig. 7-1-3.
2) The F panel block (microphone board) is not required in adjustments. Remove the following connector.
   1. CN003 of the MA-230 board
3) If remove the cabinet (R) (Power switch, camera function switch and electronic view-finder), set to the camera power supply ON mode (Note 1), and disconnect the following connectors.
   1. CN503 of VS-123 board
   2. CN206 of VS-123 board
   3. CN101 of ZB-2 board

   Be sure to exit this mode after completing the adjustment. (Note 2)
4) Turning OFF the Auto Focus Using the Adjusting Remote Commander
   1. Set data: 01 to page: 6, address: 25.
      (The auto focus will turn OFF. The focus can be adjusted using the focus button on the adjusting remote commander. But the HOLD switch must be set to OFF.)
   2. After completing the adjustment/operation check, set data: 00 to page: 6, address: 25.

Note 1: Setting the Forced Camera Power Supply ON Mode
1) Set data: 01 to page: 1, address: 00.
2) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.

By carrying out the above, the camera can be operated even if the cabinet (R) has been removed. Be sure to exit the forced camera power ON mode after completing the adjustment.

Note 2: Exiting the Forced Camera Power Supply ON Mode
1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

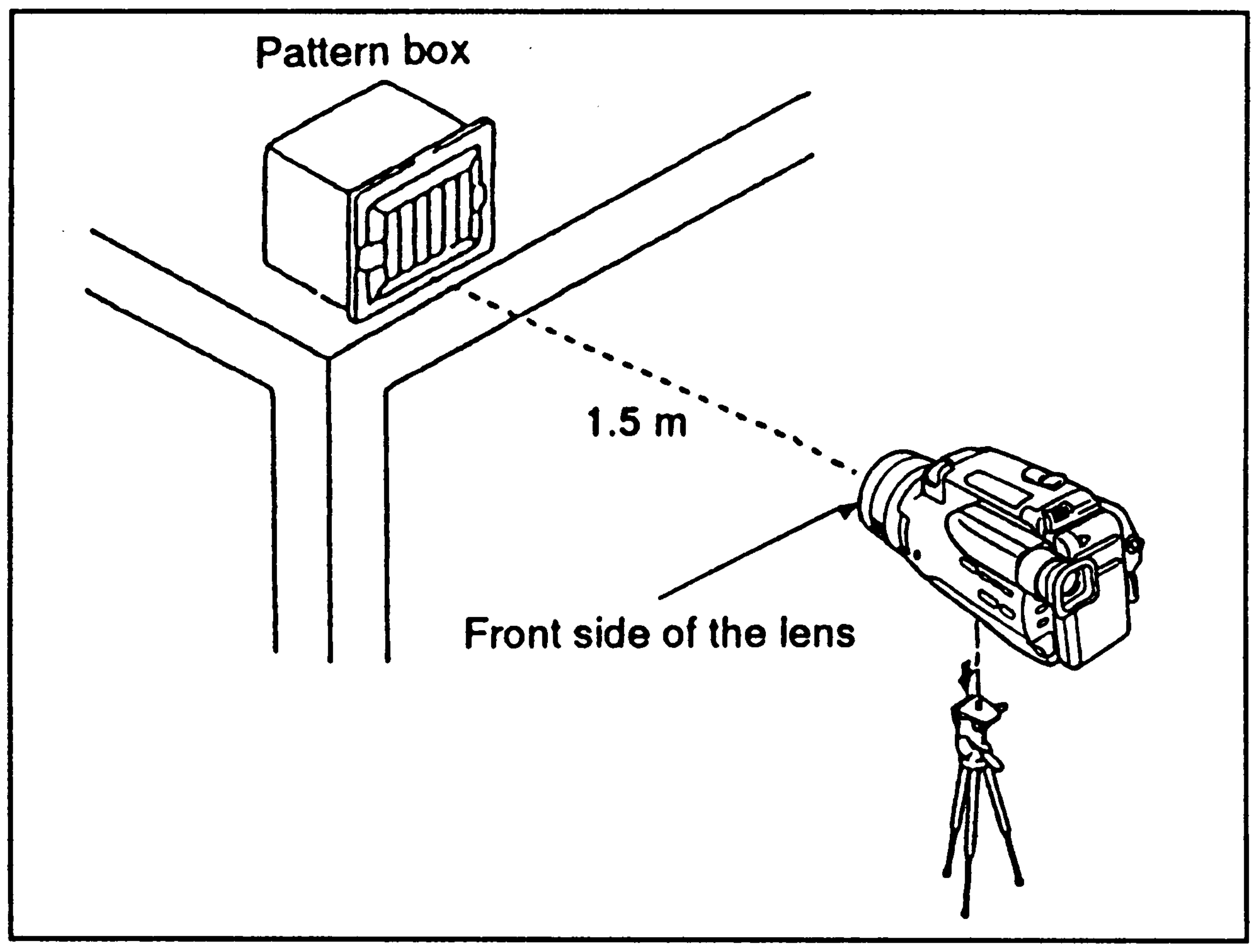
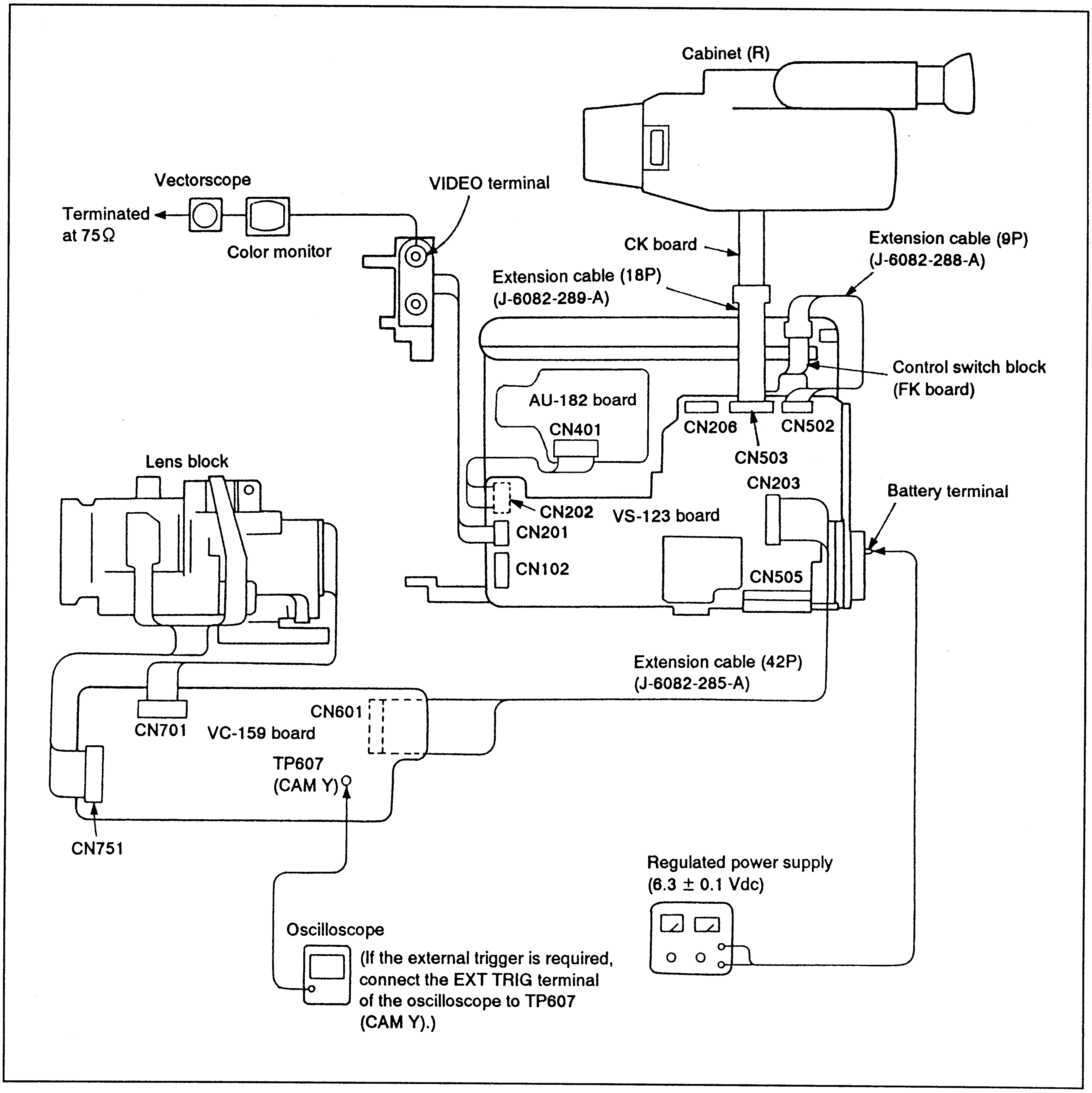


Fig. 7-1-2.


Cabinet (R)
Vectorscope
VIDEO terminal
Terminated at 75Ω
Color monitor
CK board
Extension cable (9P)
(J-6082-288-A)
Extension cable (18P)
(J-6082-289-A)
Control switch block
(FK board)
AU-182 board
CN401
CN206
CN502
CN503
Lens block
CN203
Battery terminal
CN202
VS-123 board
CN201
CN102
CN505
Extension cable (42P)
(J-6082-285-A)
CN601
CN701
VC-159 board
TP607
(CAM Y)
CN751
Regulated power supply
(6.3 ± 0.1 Vdc)
Oscilloscope

(If the external trigger is required, connect the EXT TRIG terminal of the oscilloscope to TP607 (CAM Y).)

Fig. 7-1-3.

1-1-3. Precautions

1. Switch settings

Adjust the switches to the following positions, and adjust without loading the cassette tape, unless specified otherwise.

1. Camera/player power switch (Control switch block (CK board)) ·····················Camera
2. Standby switch (Control switch block (FK board)) ·· Standby
3. PROGRAM AE button (Control switch block (CK board)) ···Off
4. BACK LIGHT button (Control switch block (CK board)) ···Off

2. Adjusting Procedure

Adjust in the given order.

3. Subject

1) Color bar chart (Standard picture frame)
   Adjust the picture frame as shown in Fig. 7-1-4. if adjustments are performed using the color bar chart.
   (Standard picture frame)
2) White pattern (Standard picture frame)
   Remove the color bar chart from the pattern box, and so that the white pattern will be displayed.
   (Don't touch the zoom switch)

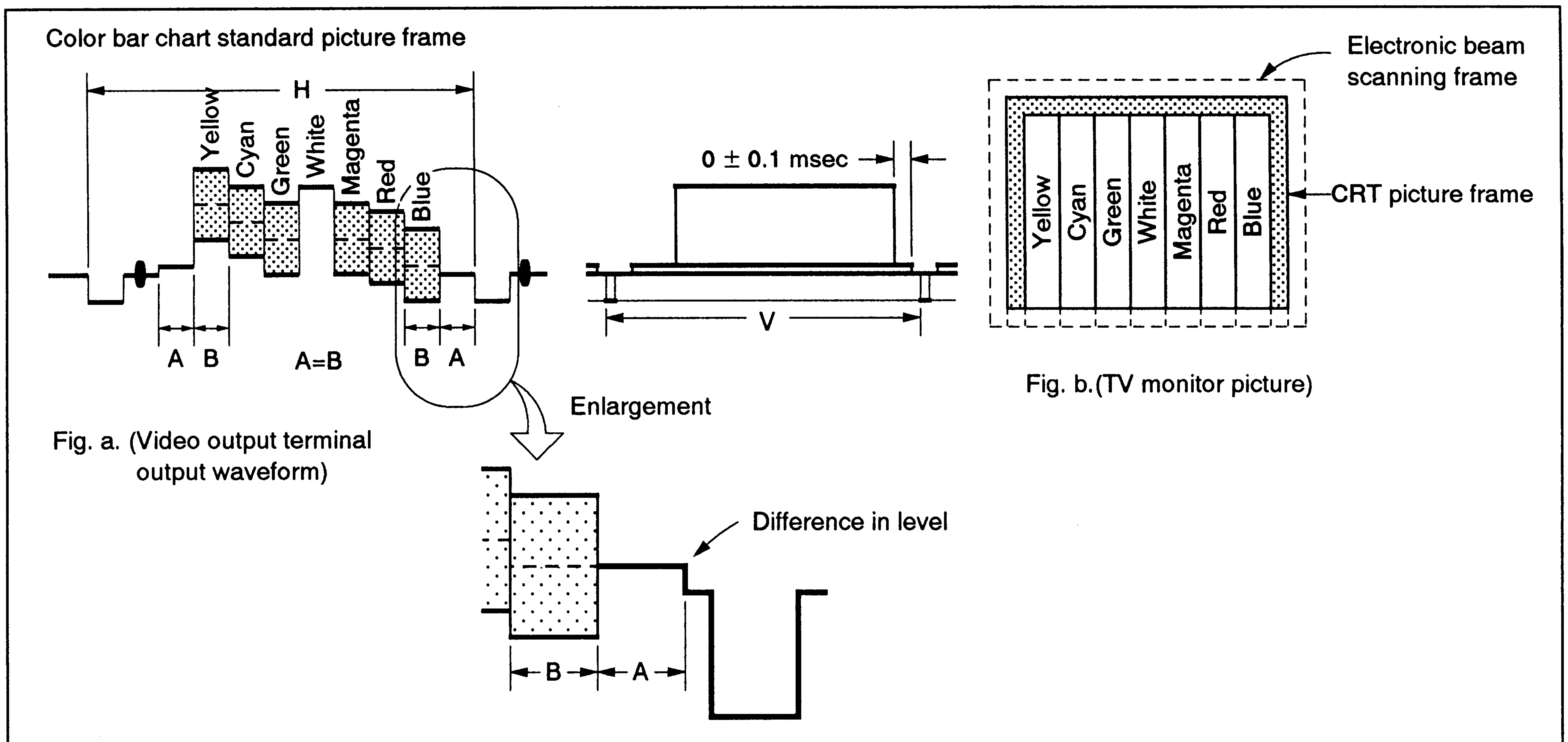

Color bar chart standard picture frame
H
Yellow
Cyan
Green
White
Magenta
Red
Blue
A B
A=B
B A
0 ± 0.1 msec
V
Enlargement
Difference in level
B
A
Electronic beam scanning frame
CRT picture frame
Yellow
Cyan
Green
White
Magenta
Red
Blue

Fig. a. (Video output terminal output waveform)

Fig. b.(TV monitor picture)

Adjust the camera zoom and direction to obtain the output waveform shown in Fig. a and the TV monitor display shown in Fig. b.

Fig. 7-1-4.

3) Chart for flange back adjustment
   Combine a white A0 size (1189 mm× 841 mm) paper to a black one, and make the chart shown in Fig. 7-1-5.

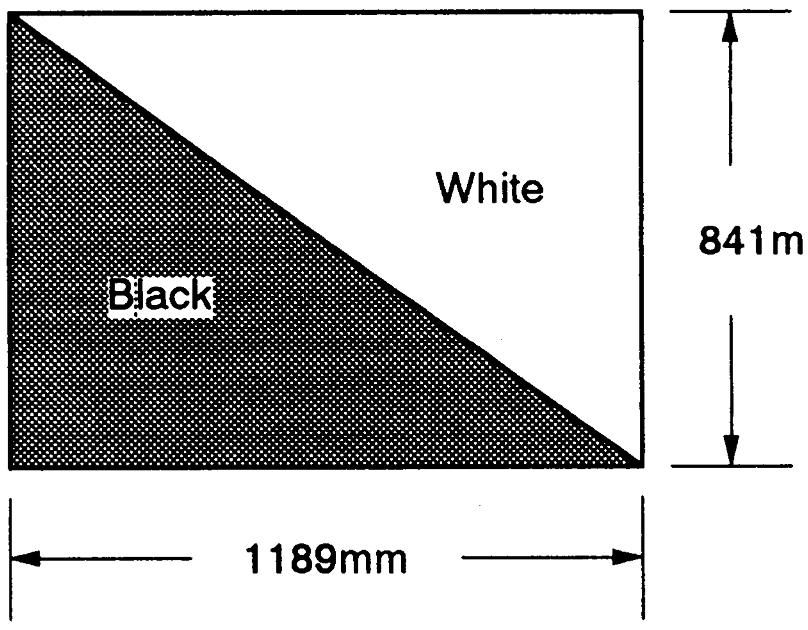

White
Black
841mm
1189mm

Fig. 7-1-5.

Note: Use the non-reflecting and non-glazing vellum paper whose size is more than A0, and make the boundary between white and black to be smoothly flat.

1-1-4. Adjusting Remote Commander

Use the adjusting remote commander to change the coefficient of the digital signal processing or the EVR data.

The adjusting remote commander uses the remote commander signal line (LANC) to perform the bidirectional communication with the camera microprocessor. The effect data of the bidirectional communication must be written in the nonvolatile memory.

1. Using the adjusting remote commander

1) Connect the adjusting remote commander to the remote terminal.
2) Adjust the HOLD switch of the adjusting remote commander to "HOLD" (SERVICE position).

If it has been properly connected, the LCD on the adjusting remote commander will display as shown in Fig. 7-1-6.

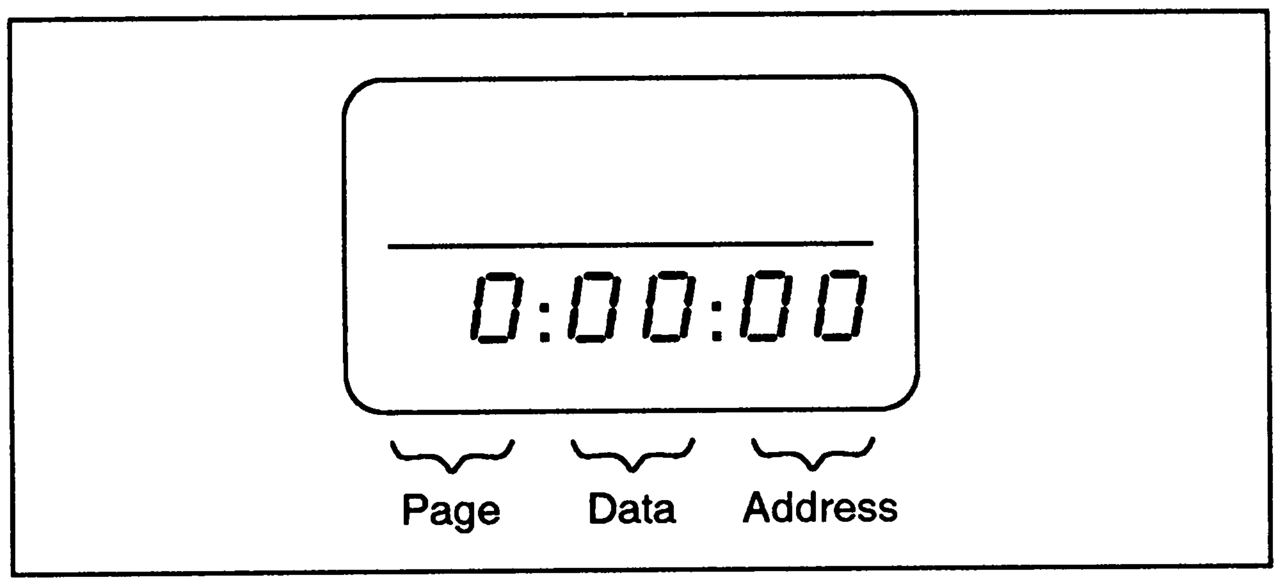


Fig. 7-1-6.

3) Operate the adjusting remote commander as follows.
   - Changing the page

     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH− button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
LCD Display	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 7-1-1.

   - Changing the address

     The address increases when the FF (►►) button is pressed, and decreases when the REW (◄◄) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)

     The data increases when the PLAY (►) button is pressed, and decreases when the STOP (■) button is pressed.

     There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data

     The PAUSE button must be pressed to write the adjustment data (F page) in the nonvolatile memory.

     (The new adjustment data will not be recorded in the nonvolatile memory if this step is not performed.)
4) Select page: 6, address: 00, and adjust the data to 01. Page F, and enables the camera section (Addresses 01 to BF of page F) to be adjusted.
5) After completing all adjustments, turn off the main power supply (6.3V) once.

2. Precautions upon using the adjusting remote commander

Mishandling of the adjusting remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.

1-1-5. Page F Address List

Note 1: The data already listed in the adjustment data memo column are fixed values.

Note 2: The adjustment data initial values are values just after executing “Page F Data Initialization” and “Page F Data Modification”. They are different from the values after executing all adjustments.

Note 3: In some cases, data have been input to the page F addresses C0 to FF. This has no relation to the adjustments.

Address	Adjustment data	
	Initial value	Memo column
00	7E	7E
01	0A	0A
02	00	00
03	00	00
04	80	
05	80	
06	80	
07	80	
08	2D	
09	26	
0A	FA	
0B	F1	
0C	30	
0D	00	
0E	58	
0F	00	
10	E0	E0
11	8F	
12	6C	
13	36	
14	3C	
15	60	
16	0D	
17	A3	
18	12	
19	8E	
1A	10	
1B	E2	
1C	0E	0E
1D	00	00
1E	80	80
1F	80	80
20	79	79
21	79	79
22	00	00

Table 7-1-2 (1).

Address	Adjustment data	
	Initial value	Memo column
23	59	59
24	43	43
25	A5	A5
26	23	23
27	3F	3F
28	23	23
29	0B	0B
2A	10	10
2B	48	48
2C	FF	FF
2D	44	44
2E	17	17
2F	22	22
30	00	00
31	00	00
32	50	50
33	68	68
34	02	02
35	35	35
36	02	02
37	FD	FD
38	63	63
39	6A	6A
3A	50	50
3B	20	20
3C	C0	C0
3D	00	00
3E	00	
3F	00	
40	00	
41	00	
42	00	
43	00	
44	00	
45	00	
46	00	
47	00	
48	00	
49	00	
4A	00	
4B	00	
4C	00	
4D	00	

Table 7-1-2 (2).

Address	Adjustment data	
	Initial value	Memo column
4E	00	00
4F	20	20
50	07	07
51	02	02
52	66	66
53	18	18
54	66	66
55	9F	9F
56	66	66
57	66	66
58	59	59
59	83	83
5A	67	67
5B	5C	5C
5C	5C	5C
5D	4A	4A
5E	1E	1E
5F	5C	5C
60	3A	3A
61	33	33
62	0C	0C
63	26	26
64	24	24
65	02	02
66	04	04
67	05	05
68	00	00
69	00	00
6A	04	04
6B	00	00
6C	04	04
6D	00	00
6E	02	02
6F	33	33
70	B0	B0
71	18	18
72	0F	0F
73	0F	0F
74	02	02
75	63	63
76	1B	1B
77	F0	F0
78	A0	A0
79	30	30

Table 7-1-2 (3).

Address	Adjustment data	
	Initial value	Memo column
7A	10	10
7B	50	50
7C	58	58
7D	88	88
7E	66	66
7F	46	46
80	18	18
81	00	00
82	20	20
83	18	18
84	02	02
85	08	08
86	40	40
87	20	20
88	40	40
89	30	30
8A	50	50
8B	60	60
8C	80	80
8D	1D	1D
8E	50	50
8F	00	00
90	00	00
91	77	77
92	00	00
93	FB	FB
94	02	02
95	32	32
96	6B	6B
97	8D	8D
98	A1	A1
99	30	30
9A	30	30
9B	21	21
9C	91	91
9D	72	72
9E	00	00
9F	00	00
A0	00	00
A1	00	00
A2	00	00
A3	00	00
A4	02	02
A5	80	80

Table 7-1-2 (4).

Address	Adjustment data	
	Initial value	Memo column
A6	00	00
A7	80	80
A8	00	00
A9	80	80
AA	00	00
AB	80	80
AC	00	00
AD	00	00
AE	02	02
AF	44	44
B0	3D	3D
B1	1B	1B
B2	3D	3D
B3	25	25
B4	12	12
B5	4B	4B
B6	00	00
B7	20	20
B8	00	00
B9	05	05
BA	00	00
BB	20	20
BC	80	80
BD	00	00
BE	00	00
BF	00	00
C0 to EF		
F0		
F1		
F2		
F3		
F4		
F5		
F6		
F7		
F8		
F9		
FA		
FB		
FC		
FD		
FE		
FF		

Table 7-1-2 (5).

1-1-6. Data Processing

The calculation of the DDS display and the adjusting remote commander display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Table 7-1-3. indicates the hexadecimal notation-the decimal notation calculation table.

Hexadecimal notation-Decimal notation

The lower digits of the hexadecimal notation The upper digits of the hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	② D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	80	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
① B (b)	176	177	178	179	180	180	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: ( ) indicate the adjusting remote control unit display.

(Example) In the case that the DDS display and the adjusting remote control unit display are BD (b d).
As the upper digit of the hexadecimal notation is B (b), and the lower digit is D (d), the intersection "189" of the ① and ② in the above table is the decimal notation to be calculated.

Table 7-1-3.

1-2. CAMERA SYSTEM ADJUSTMENT

1. Power Supply Voltage Check (DD-76 board)

Subject	Option
Measuring instrument	Digital voltmeter
D5V check	
Measurement point	Pins ㉙ of CN901
Specified value	4.9 ± 0.1 Vdc
D3.6V check	
Measurement point	Pins ㉑ and ㉒ of CN901
Specified value	3.6 ± 0.1 Vdc
CAM 5V check	
Measurement point	Pins ㉕ and ㉖ of CN901
Specified value	4.85 ± 0.1 Vdc
CAM 15V check	
Measurement point	Pin ㉗ of CN901
Specified value	15 ± 0.3 Vdc
CAM –9V check	
Measurement point	Pin ㉛ of CN901
Specified value	$-8.5^{+0.25}_{-0.4}$ Vdc

Checking method:

1) Check that each power supply voltage satisfies the specified value.

2. Page F Data Initialization

Note: It is necessary to perform all adjustments of the camera section from the beginning again if the data of page F has been initialized.

Initializing method:

1) Set data: 01 to page: 6, address: 00.
2) Check that the data of page: 6, address: 11 is 00.
3) Set data: 2D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the data of page: 6, address: 11 is 01.
5) Set data: 00 to page: 6, address: 01. and press the PAUSE button of the adjusting remote commander.
6) After performing "Page F data modification", perform all the adjustments of the camera section (page F).

3. Page F Data Modification 1

When the page F data is initialized, change the data by manual input.

Note 1: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote commander every time the new data is set.

Note 2: When changing address: 00, set the data of page: 6, address: 00 to 80.

Address	Data
00	7E
01	0A
03	00
1C	0E
25	A5
27	3F
2A	10
2B	48
2D	44
2E	17
2F	22
30	00
32	50
34	02
35	35
37	FD
38	63
50	07
54	66
57	66
58	59
5E	1E
60	3A
66	04
67	05
6A	04
6C	04
6E	02
6F	33
70	B0
71	18
74	02
77	F0
83	18

Table 7-1-4.

4. 28 MHz Original Oscillation Adjustment (VC-159 board)

Adjust the 28 MHz oscillation of the synchronization clock.
If the oscillation is not 28 MHz, the period will be inaccurate or the image will not be in color.

Subject	Not required
Measurement Point	Pin ⑧ of IC753 (JL708)
Measuring Instrument	Frequency counter
Adjusting Element	CT701
Specified Value	14318181 ± 71 Hz

Adjusting method:

1) Use CT701 to adjust the oscillation frequency to 14318181 ± 71 Hz.

5. V SUB Adjustment

Set the CCD imager V SUB voltage to the voltage specified for the imager.

Subject	Not required
Adjustment Page	F
Adjustment Address	04

Adjusting Method:

1) Read the V SUB voltage code of the CCD imager.
   Obtain the corresponding V SUB data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the V SUB data to page: F, address: 04.
4) Press the PAUSE button of the adjusting remote commander.

V SUB			V SUB		
Voltage Code	Data	Voltage (Vdc) *1	Voltage Code	Data	Voltage (Vdc) *1
e	71	9.0	q	AD	14.0
f	77	9.5	r	B3	14.5
g	7D	10.0	s	B9	15.0
h	83	10.5	t	BF	15.5
j	89	11.0	u	C5	16.0
k	8F	11.5	v	CB	16.5
l	95	12.0	w	D1	17.0
m	9B	12.5	x	D7	17.5
n	A1	13.0	y	DD	18.0
p	A7	13.5	z	E2	18.5

*1: The V SUB voltages (TP703) given are reference values.

6. VRG Adjustment

Set the CCD imager V RG voltage to the voltage specified for the imager.

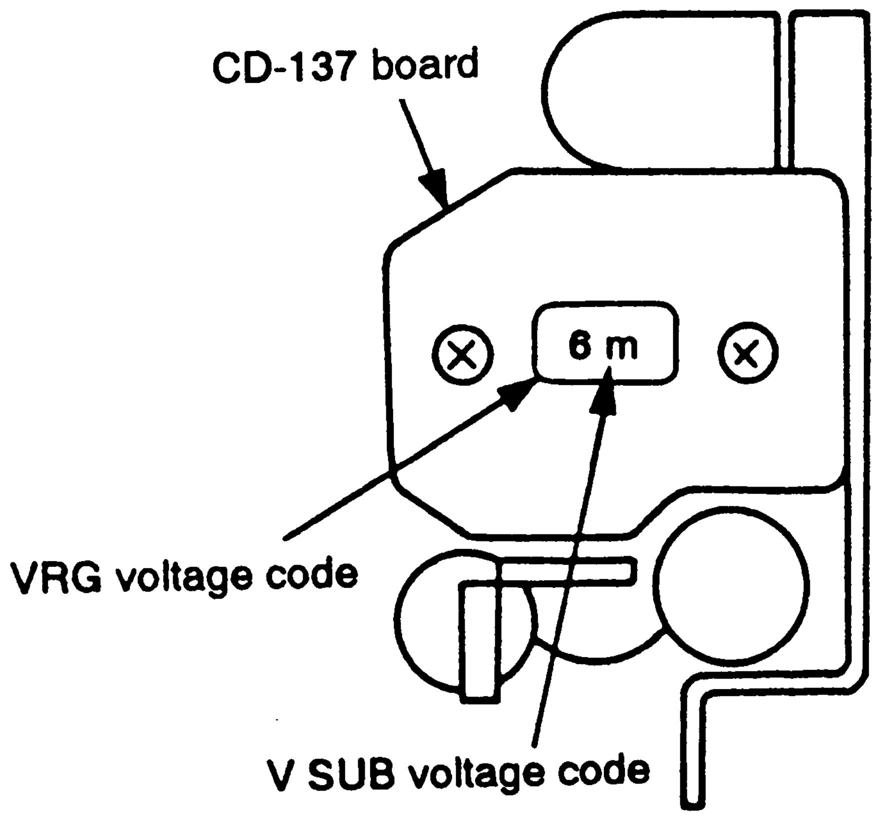
Subject	Not required
Adjustment Page	F
Adjustment Address	05

Adjusting Method:

1) Read the VRG voltage code of the CCD imager.
   Obtain the corresponding VRG data from the following table.
2) Set data: 01 to page: 6, address: 00.
3) Set the VRG data to page: F, address: 05.
4) Press the PAUSE button of the adjusting remote commander.

VRG		
Voltage Code	Data	Voltage (Vdc) *2
1	33	1.0
2	4E	1.5
3	69	2.0
4	84	2.5
5	9F	3.0
6	BA	3.5
7	D5	4.0

*2: The VRG voltages (TP707) given are reference values.



(Example) When "6m" is displayed:
The V SUB voltage code is "m" and therefore the V SUB data will be "9A".
The VRG voltage code is "6" and therefore the VRG data will be "BA".

Fig. 7-1-7.

7. HALL Adjustment

For detecting the position of the lens iris, adjust the hall AMP gain and hall offset.

Subject	Not required
Measurement Point	DDS display of LCD or monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	06, 07
Specified Value	32 to 36 during IRIS OPEN B4 to B8 during IRIS CLOSE

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 01 to page: 1, address: 00.
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 03 to page: 6, address: 02.
5) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 80 to page: F, address: 07, and press the PAUSE button of the adjusting remote commander.
7) Set data: 40 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
8) Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the monitor TV display), and set to W_2.
9) Set data: 30 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
10) Read the DDS display data, and set to W_1.
11) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
12) Read the DDS display data, and set to K_1.
13) Set data: 40 to page: F, address: 06, and press the PAUSE button.
14) Read the DDS display data, and set to K_2.
15) Convert W_1, W_2, K_1, K_2 to decimal notation, and obtain W_1', W_2', K_1', K_2'. (Refer to Table 7-1-3. "Hexadecimal notation-decimal notation conversion table".)
16) Calculate X_1' using the following equations (decimal notation calculation).

$$A' = W_2' + K_1' - W_1' - K_2' \cdots\cdots \text{Equation 1}$$

$$B' = W_1' - K_1' \cdots\cdots \text{Equation 2}$$

$$X_1' = \frac{2080 + (48 \times A') - (16 \times B')}{A'} \cdots\cdots \text{Equation 3}$$

17) Convert X_1' to hexadecimal notation, and obtain X_1. (Round off to one decimal place)
18) Set data: X_1 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
19) Change the data of page: F, address: 07, and adjust the DDS display data to "34".
20) Press the PAUSE button of the adjusting remote commander.
21) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
22) Read the DDS display data, and set to W_0. If W_0 lies within the "B4" to "B8" range, perform "Processing after completing adjustments". If it lies outside the range, perform the following adjustments.
23) Convert W_0 to hexadecimal notation, and obtain W_0'.
24) Calculate X_2' using the following equations (decimal notation calculation).

$$C' = W_0' - B' - 52 \cdots\cdots \text{Equation 4}$$

$$X_2' = \frac{(130 - B') \times (X_1' - 48) + 48 \times C'}{C'} \cdots\cdots \text{Equation 5}$$

(X_1' and B' are values obtained from equations 2 and3)

25) Convert X_2' to hexadecimal notation and obtain X_2. (Round off to one decimal place)
26) Set data X_2 to page: F, address: 06, and press the PAUSE button of the adjusting remote commander.
27) Change the data of page: F, address: 07, and adjust the DDS display data to "B6".
28) Press the PAUSE button of the adjusting remote commander.
29) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
30) Check that the DDS display data lies within the "32" to "36" range.

Processing after Completing Adjustments

1) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

8. Flange Back Adjustment

The flange back adjustment for the inner focus lens is performed automatically.

Subject	Chart for flange back adjustment (2000 ± 5 mm from the front side of the lens Luminance: 300 ± 50 lux)
Measurement Point	Check the operations on the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	16, 17, 18, 19, 1A, 1B

Adjusting method:

1) Check that the flange back adjustment chart center and the exposure display center coincide at both zoom lens TELE end and WIDE end.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 21 is 00.
4) Check that the page: F, address: 16 to 1B data is at the initial value. (Refer to Table 7-1-4. "Page F address list")
5) Set data: 13 to page: 6, address: 01 and press the PAUSE button of the adjusting remote commander.
6) Set data: 15 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (The adjustment data is automatically input to page: F, addresses: 16 to 1B.)
7) Check that the data of page: 6, address: 21 is 01.
   (Display indicating flange back adjustment completion)

Processing after completing adjustments

1) Turn off the main power supply (6.3V).

9. Flange Back Check

Subject	Siemens star (2m from the front of the lens)
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Specified Value	Focused at the TELE end and WIDE end.

Checking method:

1) Place the Siemens star 2m from the front of the lens.
2) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appears on the image.
3) Shoot the siemens star with the zoom TELE end.
4) Check that the lens is focused. (Note 2)
5) Set data: 01 to page: 6, address: 25.
6) Shoot the siemens star with the zoom WIDE end.
7) Check that the lens is focused.

Note: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on page A of the adjusting remote commander.

1) Set data: 0C to page: 6, address: 02.
2) Page A shows the state of the focus.

A : 00 : XX
→ (Odd: Focused
Even: Unfocused)

Processing after compleating adjustments

1) Set data: 00 to page: 6, address: 02.
2) Set data: 00 to page: 6, address: 25.

10. Picture Frame Setting

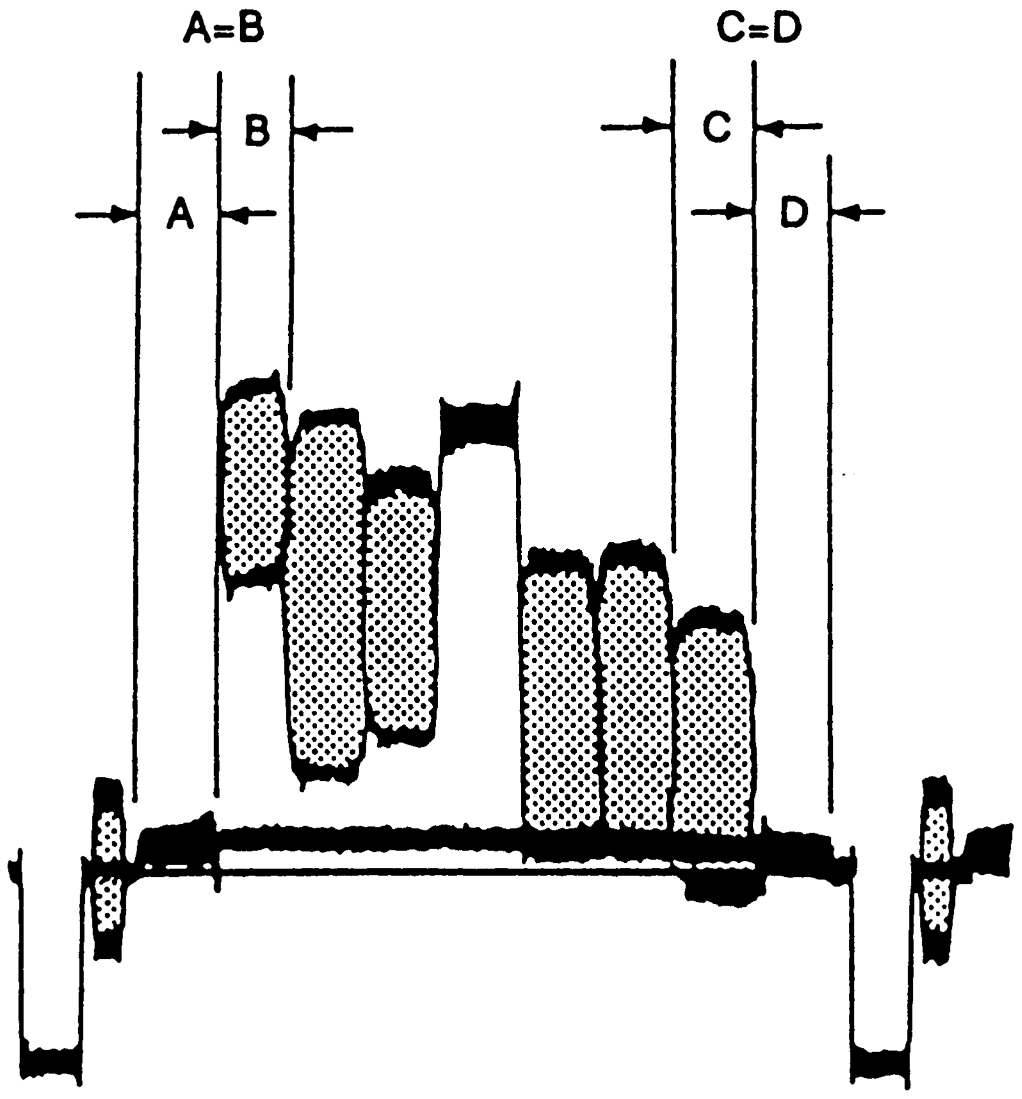
Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Oscilloscope and TV monitor.
Specified Value	A=B, C=D, t=0 ± 0.1 msec

Setting method:

1) Adjust the zoom and the camera direction, and set to the specified position.
2) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "color bar chart standard picture frame".

Check on the oscilloscope

1. horizontal period



2. Vertical period

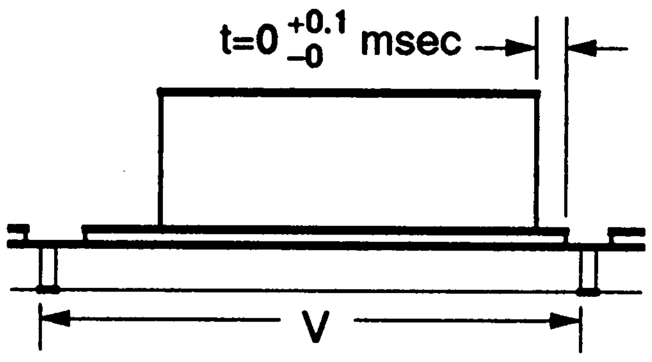

$t=0^{+0.1}_{-0}$ msec
V

Fig. 7-1-8.

Check on the TV monitor

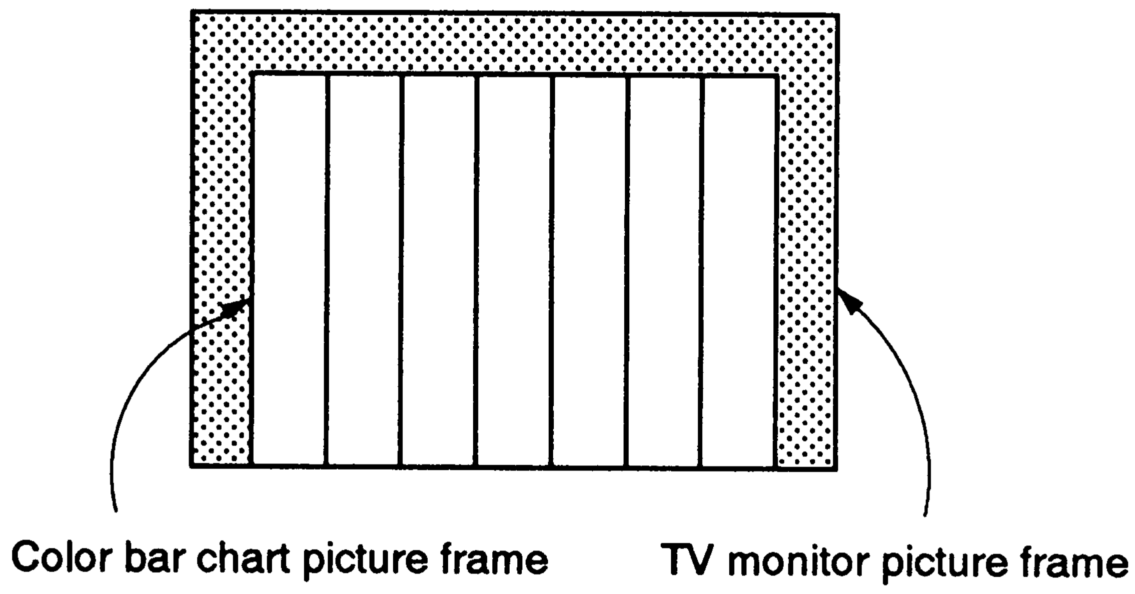

Color bar chart picture frame
TV monitor picture frame

Fig. 7-1-9.

11. Color Reproduction Adjustment

Adjust the color separation matrix coefficient so that the proper color reproduction is produced.

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	08, 09, 0A, 0B
Specified Value	All color luminance points should settle within each color reproduction frame.

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 00 to page: 6, address: 03.
3) Set data: F1 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
4) Set data: 02 to page: F, address: 50, and press the PAUSE button of the adjusting remote commander.
5) Set data: C6 to page: F, address: 63, and press the PAUSE button of the adjusting remote commander.
6) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
7) Change the data of addresses 08, 09, 0A and 0B of page: F, and settle each color luminance point in each color reproduction frame.

   Note 1: Be sure to press the PAUSE button of the adjusting remote commander before changing the addresses.
   If not, the new data will not be written to the memory.
8) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: E0 to page: F, address: 10 and press the PAUSE button of the adjusting remote commander.
2) Set data: 07 to page: F, address: 50, and press the PAUSE button of the adjusting remote commander.
3) Set data: 26 to page: F, address: 63, and press the PAUSE button of the adjusting remote commander.
4) Set data: 10 to page: 6, address: 03.

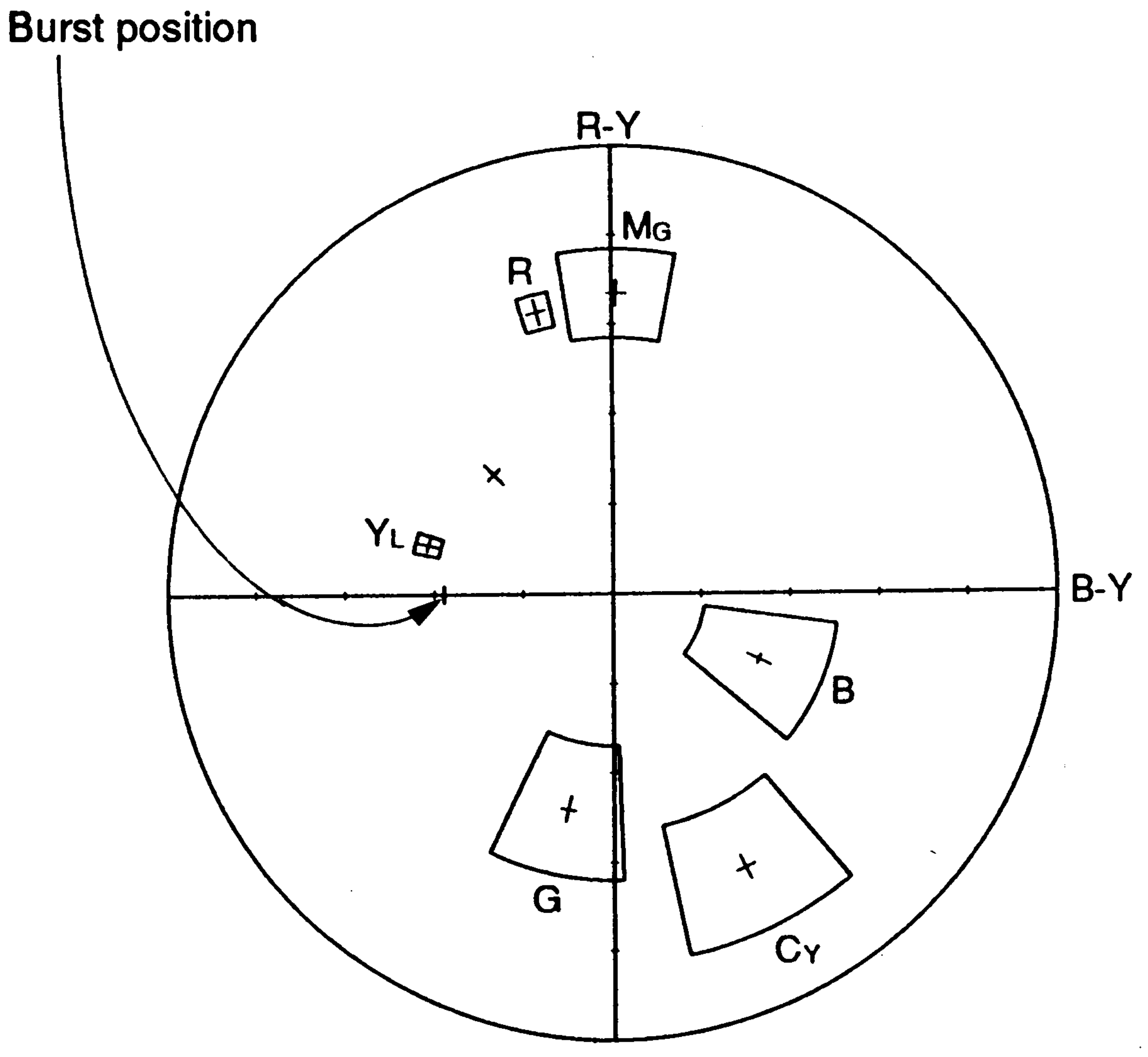


Fig. 7-1-10.

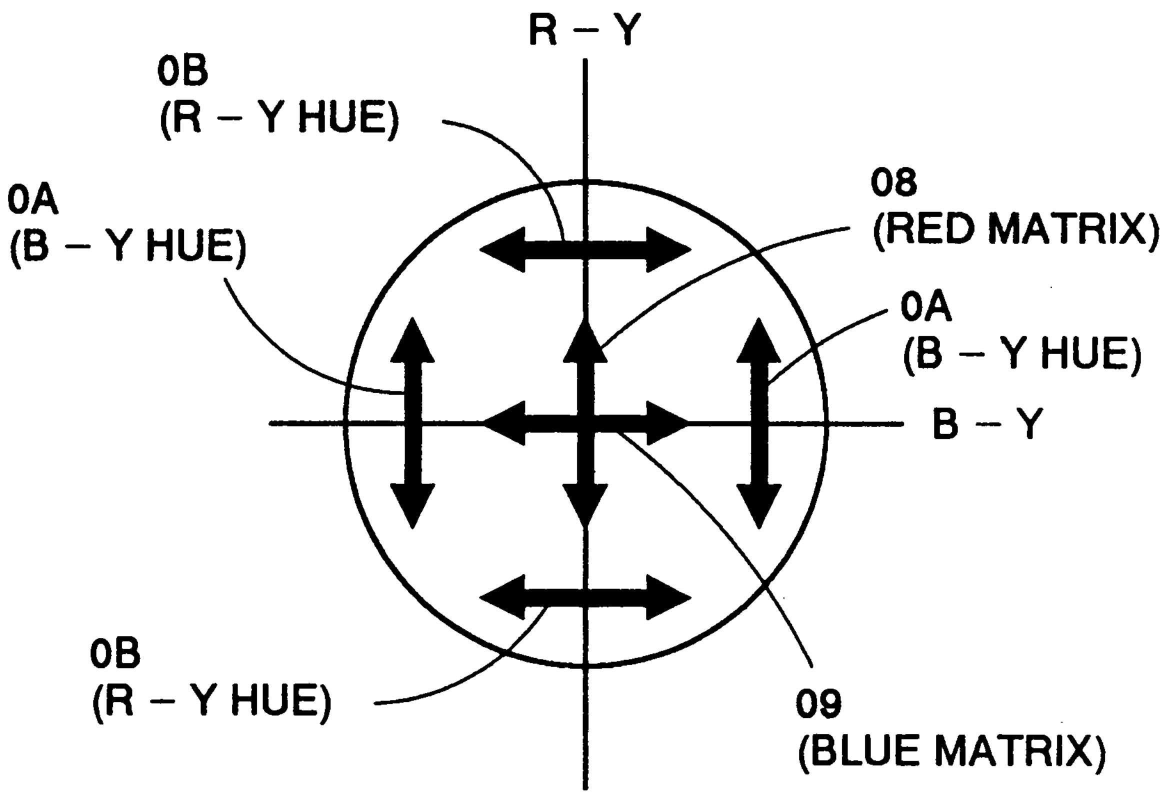


Fig. 7-1-11. Direction of the Movements of the Adjustment Address and Luminance Point

12. IRIS IN/OUT Adjustment

For the unit to judge if the white balance is indoors or outdoors, measure the light level and write it in the EEPROM.
If the level is not correct, the white balance will not be accurate.

Subject	White pattern
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	13, 14

Adjusting method:

1) Set data: 01 to page: 6, address: 00
2) Set data: 01 to page: 1, address: 00
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 0E to page: 6, address: 02.
5) Set data: 0B to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Read the DDS display data (Note 1), and take the upper two digits as D_1 and the lower two as D_2.
7) Convert D_1 to a decimal number and obtain D_1'. (Refer to Table 7-1-3. "Hexadecimal Notation-Decimal Notation Conversion Table".)
8) Calculate D_3' using the following equations.
   (Equations 1 and 2 are for decimal notation calculation)
   When $D_2 \geqq D0$
   $D_3'=D_1'-21$ ··································Equation 1
   When $D_2 < D0$
   $D_3'=D_1'-22$ ··································Equation 2
9) Convert D_3' to a hexadecimal number and obtain D_3.
10) Set D_3 to page: F, address: 13, and press the PAUSE button of the adjusting remote commander.
11) Set data: 09 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
12) Read the DDS display data (Note 1), and take the upper two digits as D_4 and the lower two as D_5.
13) Convert D_4 to a decimal number and obtain D_4'. (Refer to Table 7-1-3. "Hexadecimal Notation-Decimal Notation Conversion Table".)
14) Calculate D_6' using the following equations.
   (Equations 3 and 4 are for decimal notation calculation)
   When $D_5 \geqq F0$
   $D_6'=D_4'-13$ ·······································Equation 3
   When $D_5 < F0$
   $D_6'=D_4'-14$ ·······································Equation 4
15) Convert D_6' to a hexadecimal number and obtain D_6.
16) Set D_6 to page: F, address: 14, and press the PAUSE button of the adjusting remote commander.

Note 1: The right four digits of the display data at the right bottom side of the EVF and monitor TV is the LIGHT LEVEL data. If the lower digits change severely and cannot be read, record it on a tape once, play it back by frame feeding, and obtain the average value.

Processing after Completing Adjustments

1) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 1, address: 00.
3) Set data: 00 to page: 6, address: 00, and press the PAUSE button of the adjusting remote commander.
4) Set data: 00 to page: 6, address: 02.

13. MAX GAIN Adjustment

Setting the minimum illumination.
If it is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	White pattern standard picture frame
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	15
Specified Value	C4 to CC

Adjusting method:

1) Set data: 01 to page: 6, address: 00.
2) Set data: 01 to page: 1, address: 00.
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 01 to page: 2, address: 00.
5) Set data: 01 to page: 2, address: 42.
6) Set data: 5A to page: 2, address: 40.
7) Set data: 54 to page: 2, address: 41.
8) Set data: 01 to page: 6, address: 02.
9) Set data: 19 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
10) Change the data of page: F, address: 15 and adjust so that the DDS display data lies within the "C4" to "CC".
11) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 1, address: 00.
3) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Set data: 00 to page: 6, address: 02.
5) Set data: 01 to page: 2, address: 00.
6) Set data: 00 to page: 2, address: 40.
7) Set data: 00 to page: 2, address: 41.
8) Set data: 00 to page: 2, address: 42.
9) Set data: 00 to page: 2, address: 00.

14. Auto White Balance Standard Data Input

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	0C, 0D, 0E, 0F

Adjusting method:

1) Turn the power of the unit OFF/ON.
2) Set data: 01 to page: 6, address: 00.
3) Check that the data of page: 6, address: 11 is 00.
4) Check that the data of page: 6, address: 03 is 10.
5) Wait for 2 seconds.
6) Set data: 11 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
7) Set data: 0D to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
   (When the standard data is taken in, the data will be automatically input to addresses 0C to 0F of page F.)
8) Check that the data of page: 6, address: 11 is 01.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.

15. Auto White Balance Adjustment

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	Check with the DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	11, 12
Specified Value	R ratio: 2A40 to 2AC0 B ratio: 5E00 to 5F00

Adjusting method:

1) Place the C14 filter for color temperature correction on the lens.
2) Set data: 01 to page: 1, address: 00.
3) Set data: 21 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 01 to page: 6, address: 00.
5) Set data: D0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
6) Set data: 04 to page: 6, address: 02.
7) Change the data of page: F, address: 11, and adjust the average value of the DDS display data (the display data at the bottom right of the EVF or the TV monitor) to the R ratio specified value.
8) Press the PAUSE button of the adjusting remote commander.
9) Set data: 05 to page: 6, address: 02.
10) Change the data of page: F, address: 12, and adjust the average value of the DDS display data to the B ratio specified value.
11) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set data: E0 to page: F, address: 10, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 6, address: 02.
4) Set data: 00 to page: 1, address: 00.

16. White Balance Check

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.3
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Specified Value	Fig. 7-1-12. A to C

Checking method:

1) Check that the lens is not covered with either filter.
2) Set data: 01 to page: 6, address: 00.
3) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
4) Check that the center of the white luminance point is within the circle shown in Fig. 7-1-12.A.
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
6) Set data: 23 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
7) Place the C14 filter on the lens.
8) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-12. B.
9) Remove the C14 filter, and place the ND filter 1.3 (1.0+0.3) on the lens.
10) Check that the center of the white luminance point settles in the circle shown in Fig. 7-1-12. C.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote commander.
2) Set data: 00 to page: 6, address: 00, and press the PAUSE button.

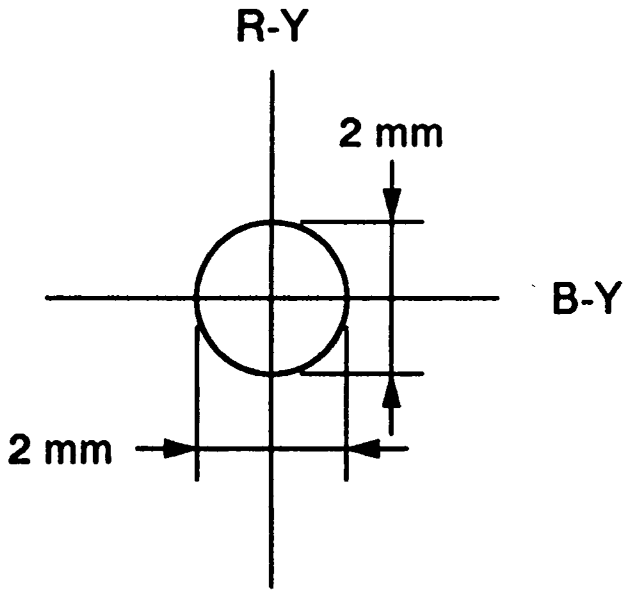


Fig. 7-1-12. A

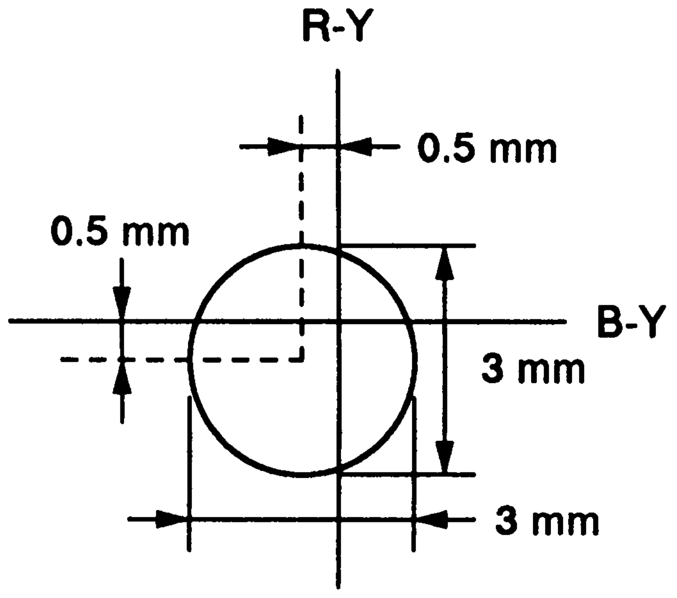


Fig. 7-1-12. B

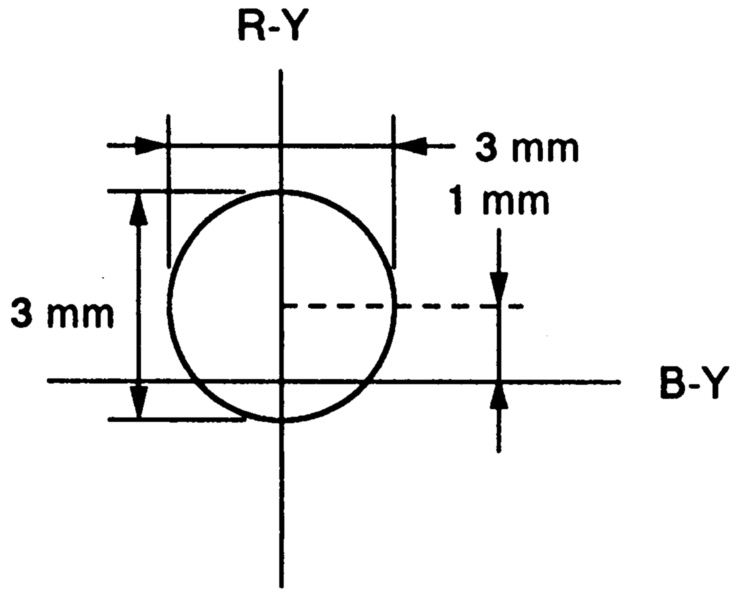


Fig. 7-1-12. C

17. VIDEO OUT Level Check

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal (Terminated at 75 Ω)
Measuring Instrument	Oscilloscope
Specified Value	Y level=680 ± 40 mV SYNC level=285 ± 20 mV BURST level=285 ± 30 mV

Checking method:

1) Check that the Y level, SYNC level and BURST level satisfy the specified values.

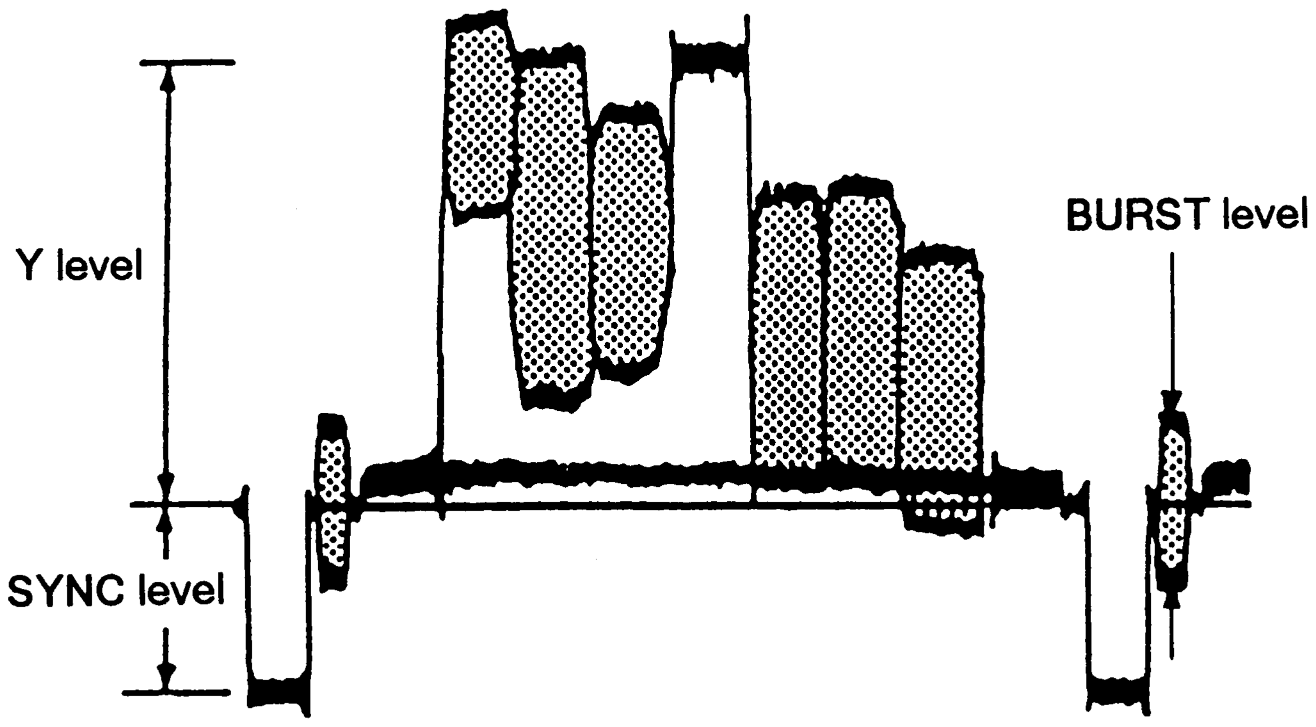


Fig. 7-1-13.

1-3. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT (CCD-FX240)

1-3-1. Horizontal Tilt Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Specified Value	See Fig. 7-1-15.

Adjustment method:

1) Adjust RV503 (BRIGHT) for appropriate brightness on CRT screen.
2) Loosen the DY (deflection yoke) tightening nut. (See Fig. 7-1-14.)
3) Make a picture horizontal by turning the DY.
4) Retighten the nut. (Do not tighten excessively.)

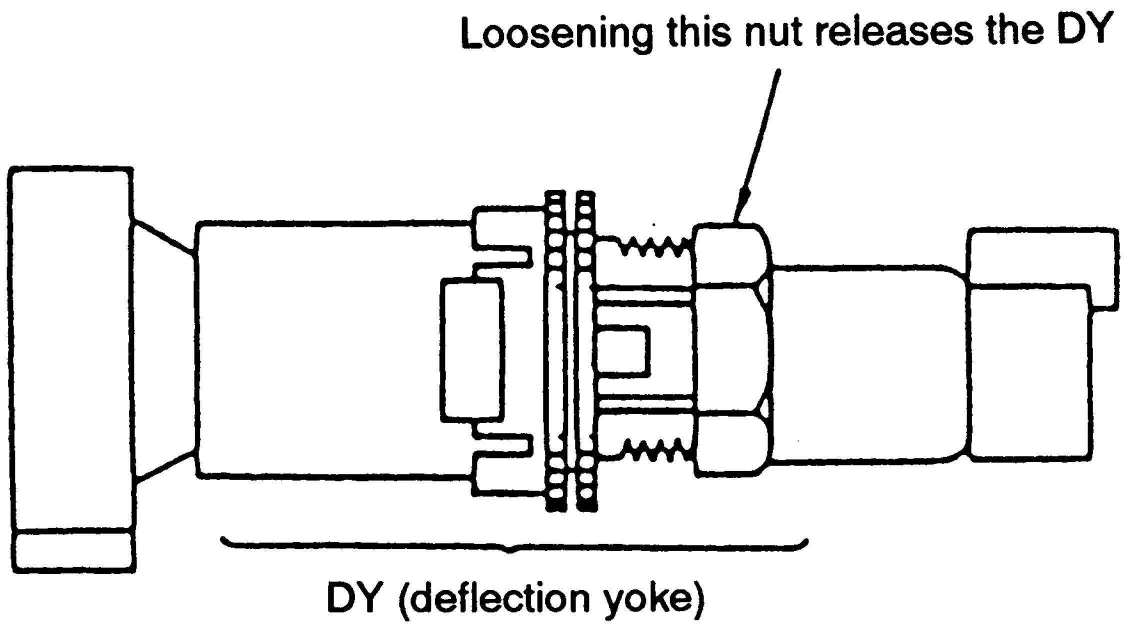
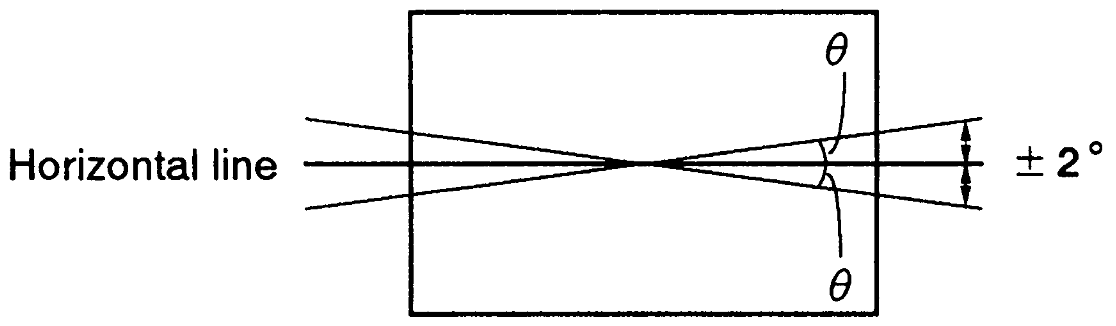


Fig. 7-1-14.



Specified value: Image orientation within ± 2° of horizontal line.

Fig. 7-1-15.

1-3-2. Centering Adjustment

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Specified Value	See Fig. 7-1-17.

Adjustment method:

1) Turn the centering adjustment rings to provide an image with even right, left, upper and lower margins. (See Fig. 7-1-16.)

Note: Since the centering position is affected by the earth magnetism, turn the equipment over 360° horizontally, and make adjustments at the orientation which exhibits median displacements of the image.

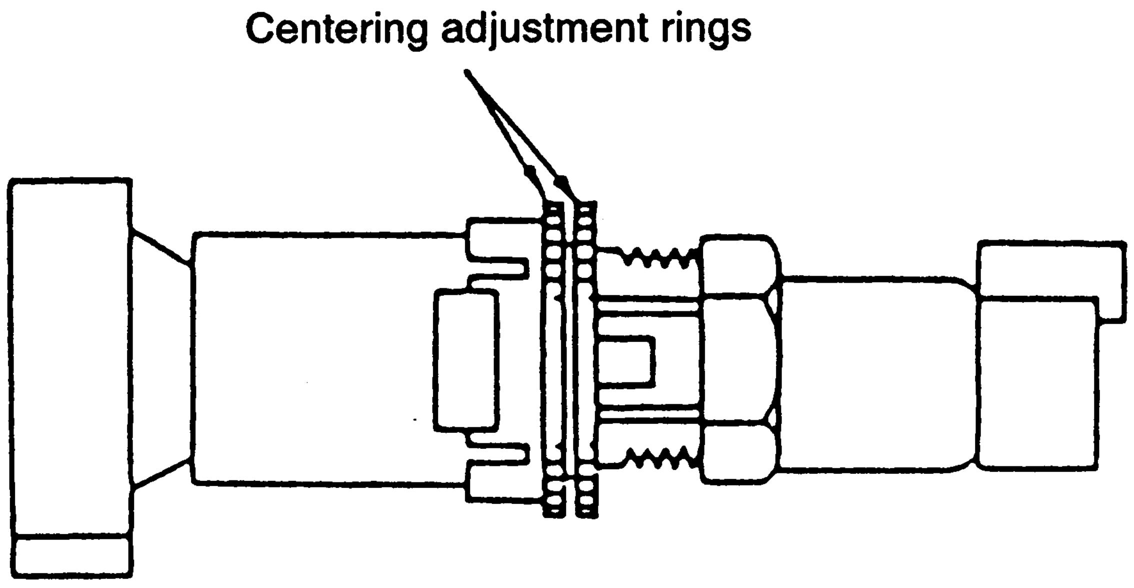
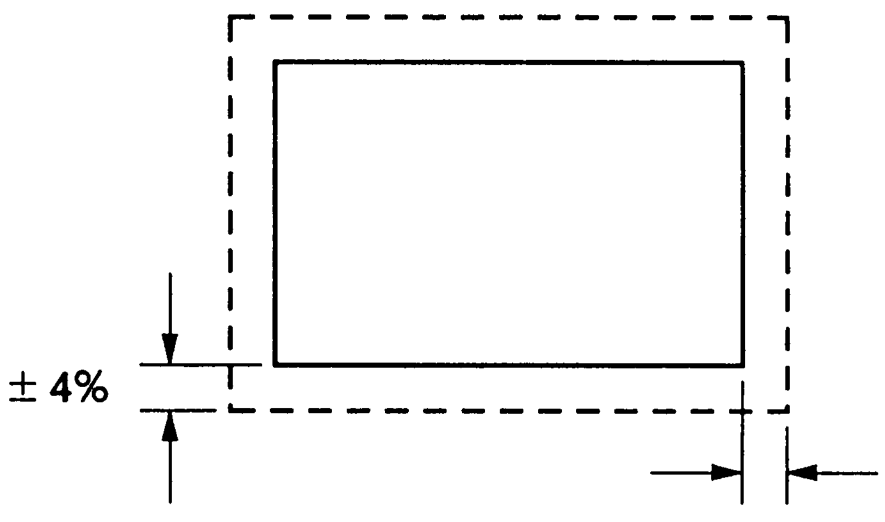


Fig. 7-1-16.



Adjustment value: ± 4%

Fig. 7-1-17.

1-3-3. Horizontal Amplitude Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	C504
Specified Value	6 ± 3%

Adjustment method:

1) Line up the upper and lower sections of the monoscope image with the upper and lower edges of the screen by RV505 (V SIZE).
2) Rotate RV503 (BRIGHT) to set the brightness to the normal level.
3) Short or open the pattern $\boxed{A}$ of the H size adjustment capacitor (C504) to provide horizontal overscans of 6 ± 3% (total of left and right). (See Fig. 7-1-19.)

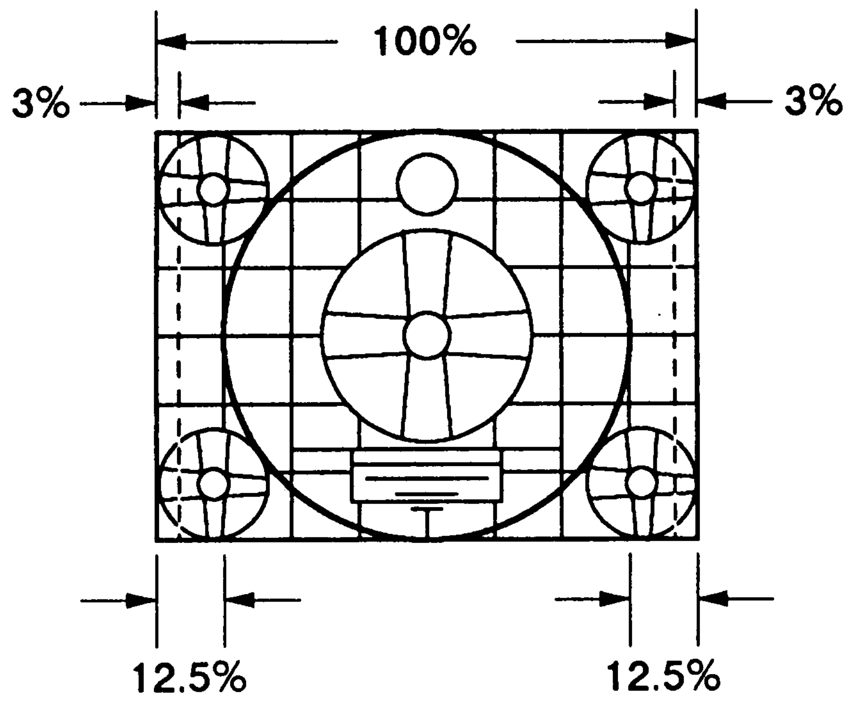
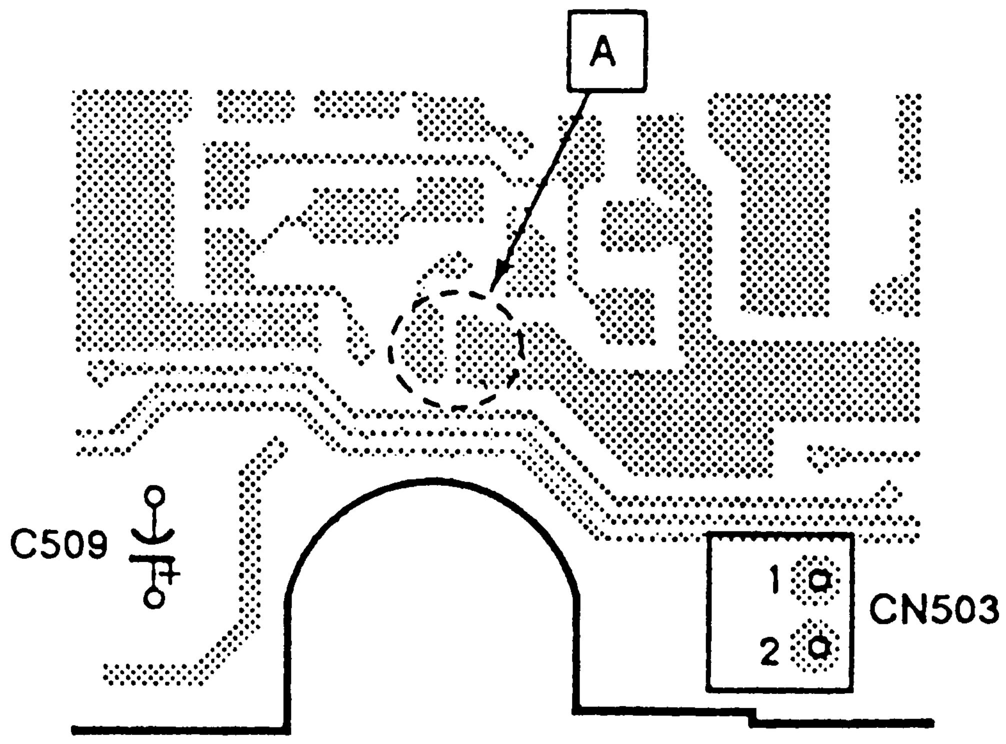


Fig. 7-1-18.



VF- VF-44 BOARD (COMPONENT SIDE)

A section	H size
Short	Large
Open	Small

Fig. 7-1-19.

1-3-4. Vertical Amplitude Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	RV505 (V SIZE)
Specified Value	5 ± 3%

Adjustment method:

1) By turning RV505 (V SIZE), adjust vertical overscan to 5 ± 3% (upper and lower total).

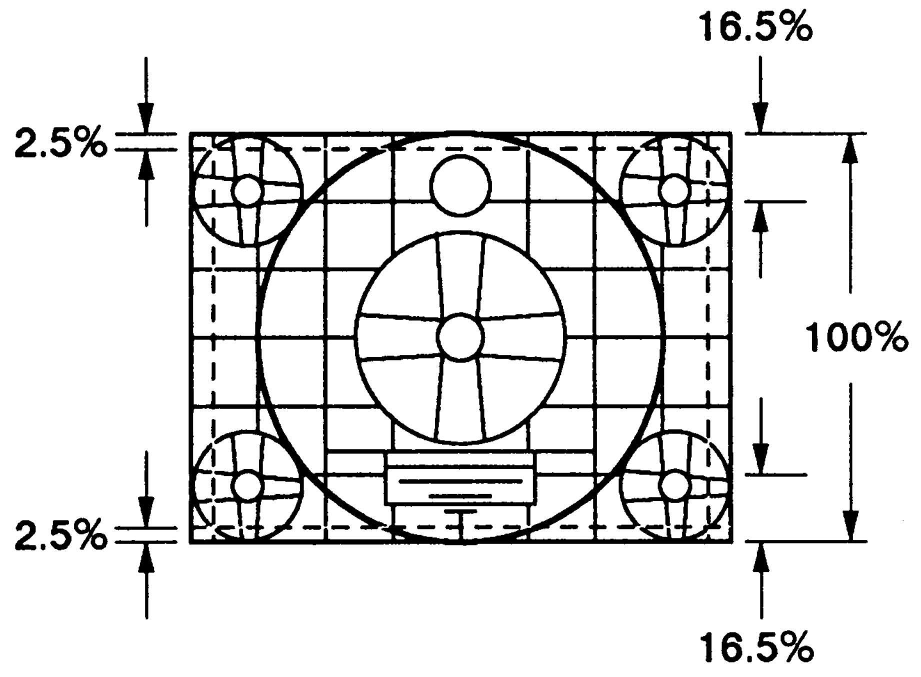


Fig. 7-1-20.

1-3-5. Focus Adjustment (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	RV502 (FOCUS)

Adjustment method:

1) Adjust to the best focus point with RV502.

1-3-6. Brightness, Contrast Adjustments (VF-44 Board)

Mode	Playback
Signal	Alignment tape for checking operation (WR5-5NSP) Monoscope portion
Adjustment Element	Brightness: RV503 (BRIGHT) Contrast: RV501 (CONT)

Adjustment method:

1) Adjust RV503 (BRIGHT) and RV501 (CONT) alternately until the bright and dark areas of a gray scale are displayed correctly. (The bright areas should not be made too bright to avoid a fuzzy display of the cross-hatches in the monoscope circle, and the brightness of the dark areas should be such that discrimination between the darkest and second darkest area is possible.)

1-4. COLOR ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS (CCD-FX340)

Note 1: The backlight (fluorescent tube) is driven by a 800 Vp-p, 16 kHz AC power supply.
Therefore, be careful not to touch the backlight holder as you will receive an electric shock.

Note 2: When replacing the LCD unit, ensure there will be no damages by static electricity.

[Adjusting connector]

Most measuring points for adjusting the view-finder are concentrated at CN801 of the VF-68 board. Connect the measuring equipments via the measuring pin tool. The following table lists the pin numbers and signal names of CN801.

Pin No.	Signal Name	Pin No.	Signal Name
1	LC COM	2	EVF GND
3	G OUT	4	13.5V
5	SELFR	6	12V
7	R OUT	8	B OUT
9	BRIGHT	10	PCO

Table 7-1-5.

Measuring pin tool Parts Code: J-6082-192-A

[Positions of RVs during adjustments]

Unless specified otherwise, set RVs to the following positions and adjust.

RV953 (BRIGHT)········· Refer to "BRIGHT Adjustment"
RV954 (COLOR)·········· Mechanical center
RV955 (HUE)··20° ± 15° from the mechanical center in the counterclockwise (↺).

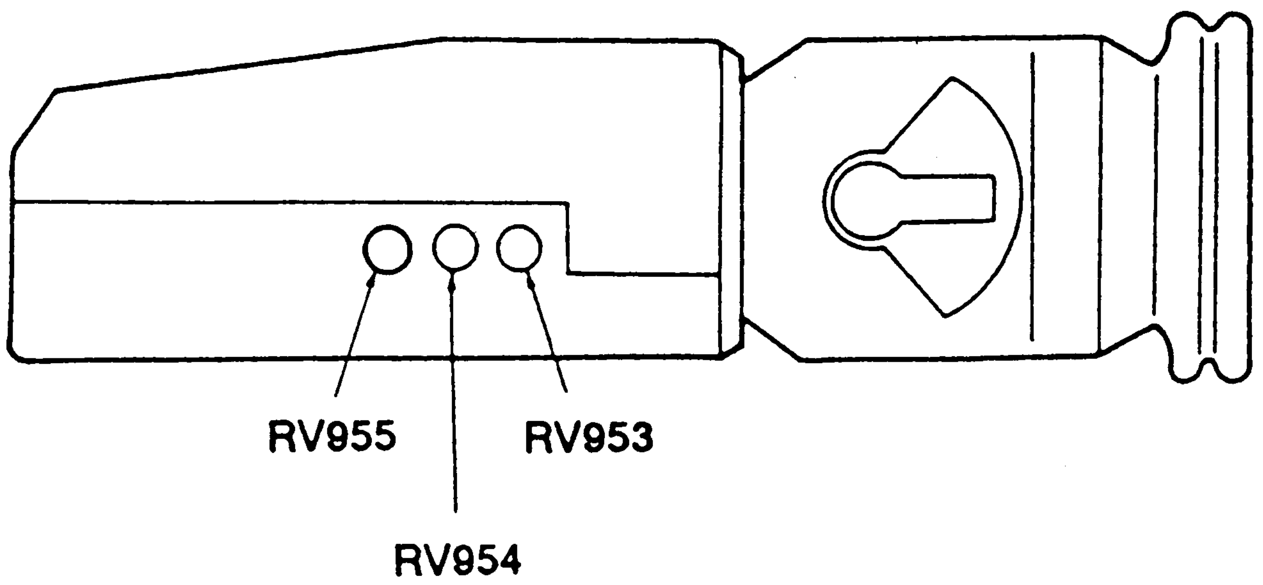


Fig. 7-1-21.

[Power Supply Voltage]

Adjust the power supply voltage for the battery pin so that Pin ① (EVF UNREG) of CN951 of the VF-69 board becomes 6.0 ± 0.1 Vdc.

[Connecting the Pattern Generator]

Connect the pattern generator as shown Fig. 7-1-22.

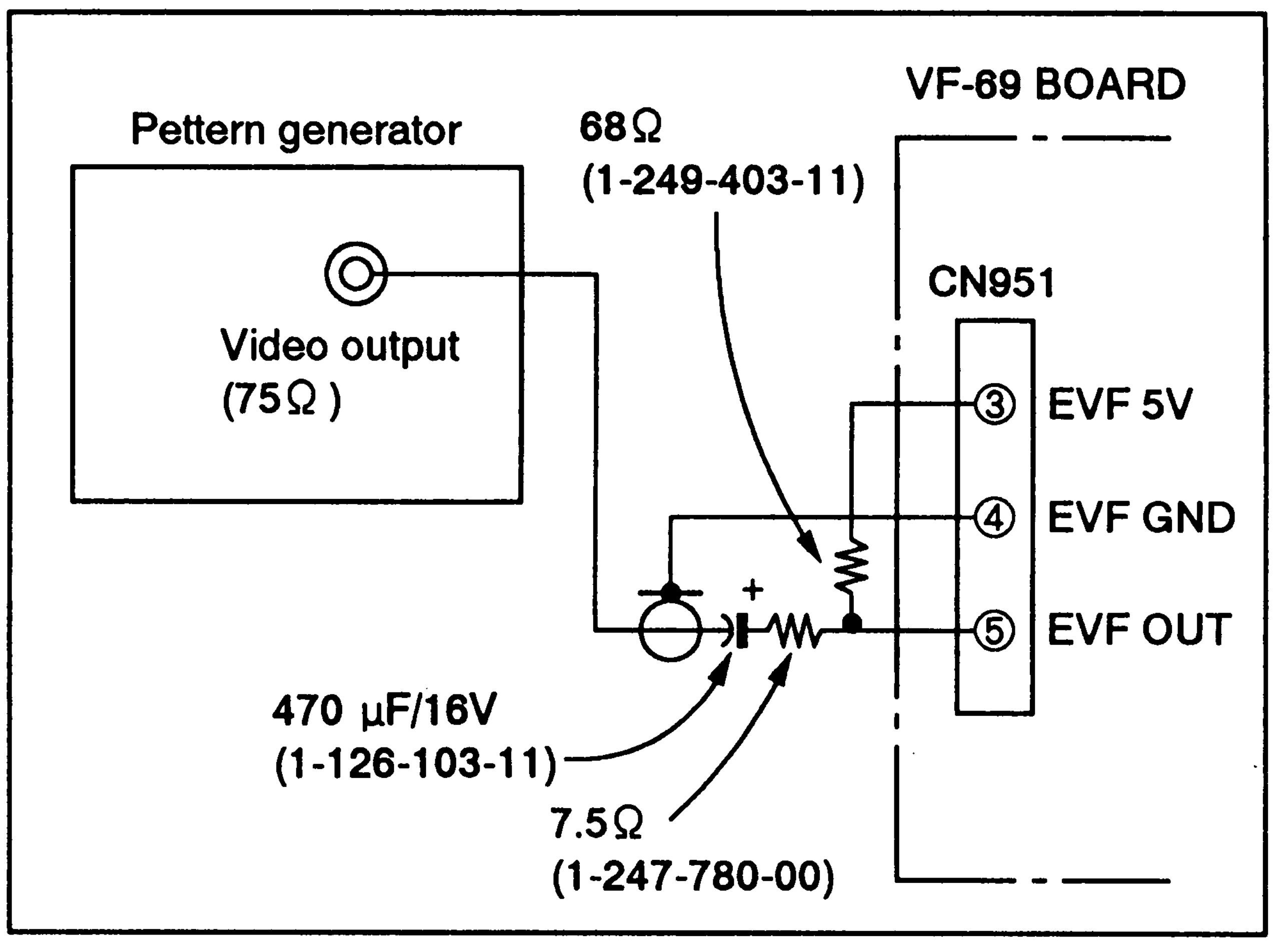


Fig. 7-1-22.

[Video Input Signal for Adjusting]

If the signal column specifies "Color bar signal whose chroma signal and burst signal are turned off", input a color bar signal whose chroma signal and burst signal have been turned off to the video input pin as the video input signal for adjusting. Check that the signal level of Pin ⑤ of CN951 of the VF-69 board is 0.9 ± 0.12 Vp-p before adjusting.

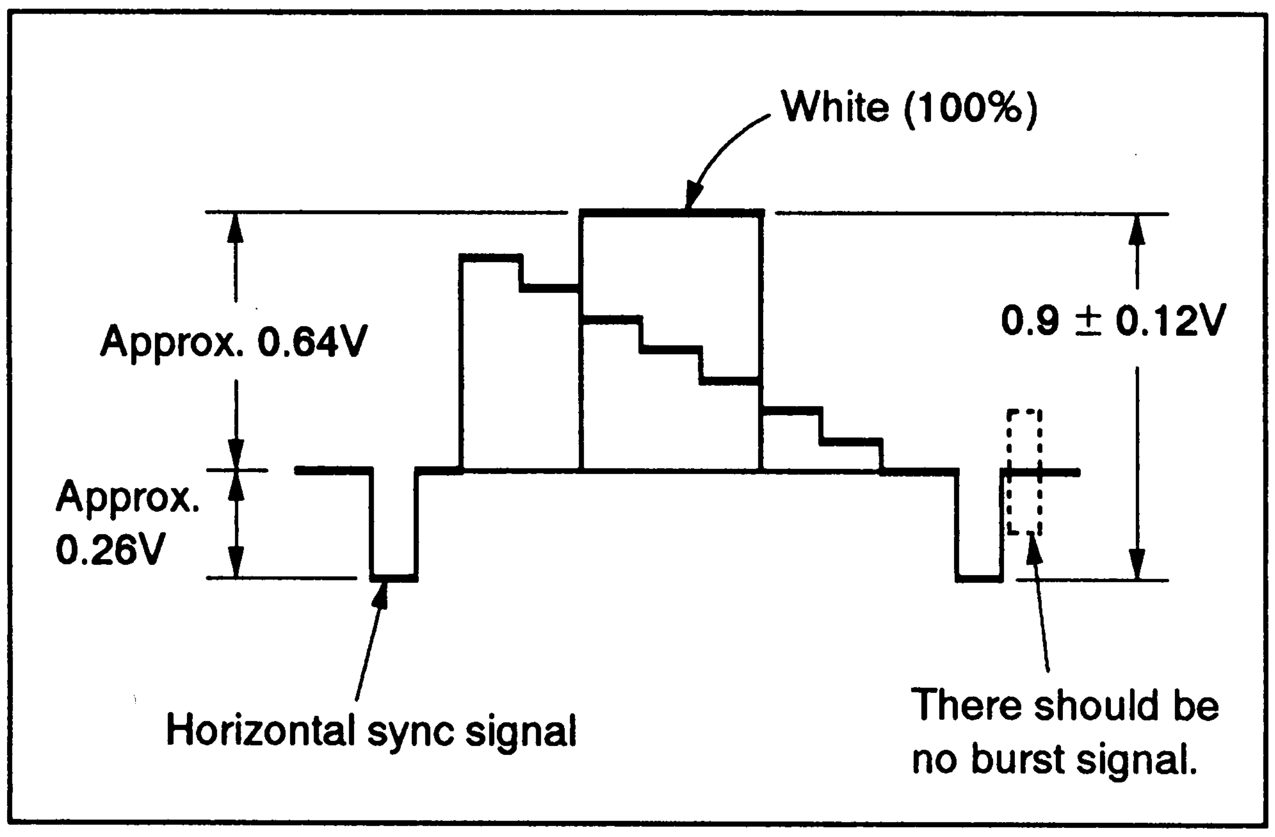


Fig. 7-1-23. Color bar signal turning off chroma and burst signals

1. Current consumption adjustment (VF-69 board)

Adjust the luminance and color temperature of the back light.
If these are not correct, the image will be brighter or darker than normal.

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Remove L953 and measure +: Pin ① of CN951 –: ⊕ pin of C958
Measuring Instrument	Ammeter
Adjustment Element	RV951
Specified Value	85 ± 5 mA

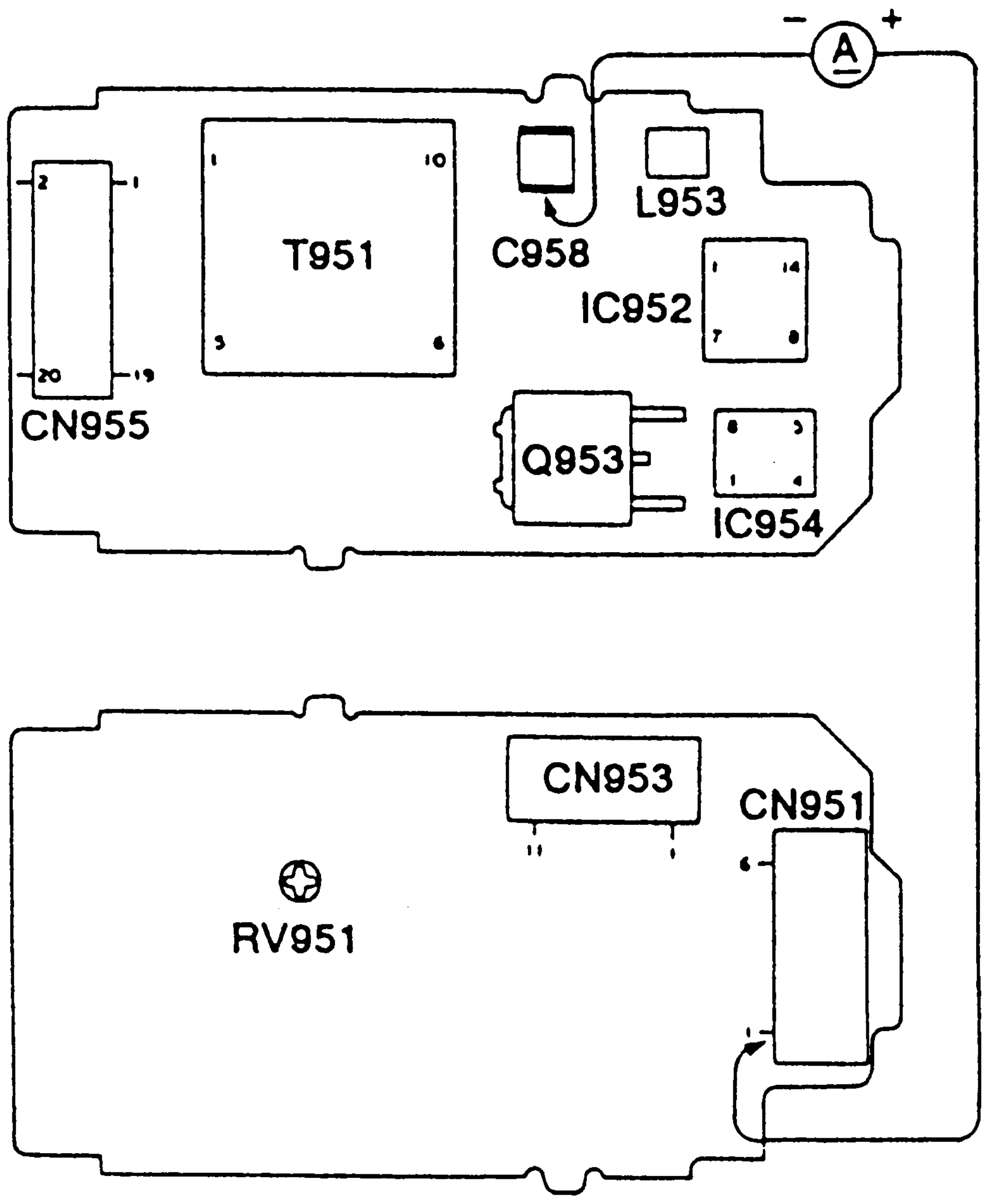
Note 1: Adjust within 30 secs. after the power supply has been turned on.

Note 2: After adjusting, connect L953.

Adjusting method:

1. Check that the voltage of Pin ① of CN951 is 6.0 ± 0.1 Vdc.
2. Adjust the current consumption to 85 ± 5 mA with RV951.

VF-69 board Component side



–
A
+
T951
C958
L953
IC952
CN955
Q953
IC954
CN953
CN951
RV951

VF-69 board Conductor side

Fig. 7-1-24.

2. Power supply voltage check (VF-68 Board)

Mode	Stop
Measuring Instrument	Digital voltmeter
+12V check	
Measurement Point	Pin ⑥ of CN801 (12V)
Specified Value	+11.6 ± 0.2 Vdc
+13.5V check	
Measurement Point	Pin ④ of CN801 (13.5V)
Specified Value	+13.5 ± 0.3 Vdc

Checking Method:

1. Check that the UNREG power supply voltage (Pin ① of VF-69 board CN951) of CN951 is 6.0 ± 0.1 Vdc.
2. Check that each power supply voltage satisfies the specified value.

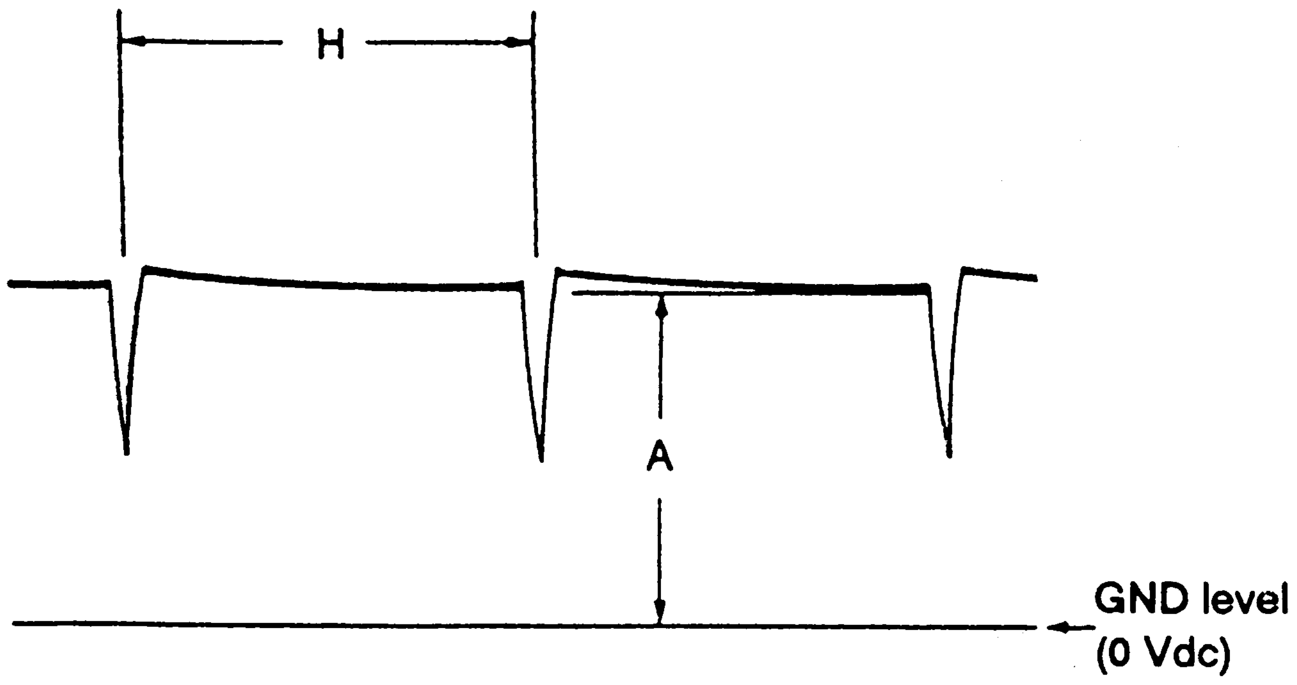
3. VCO adjustment (VF-68 Board)

Set the free running frequency of the VCO.
If it is not correct, the image will waver.

Mode	Stop
Signal	Color bar
Measurement Point	Pin ⑩ of CN801 (PCO)
Measuring Instrument	Oscilloscope (DC range)
Adjustment Element	RV804
Specified Value	A=2.8 ± 0.1V

Adjusting method:

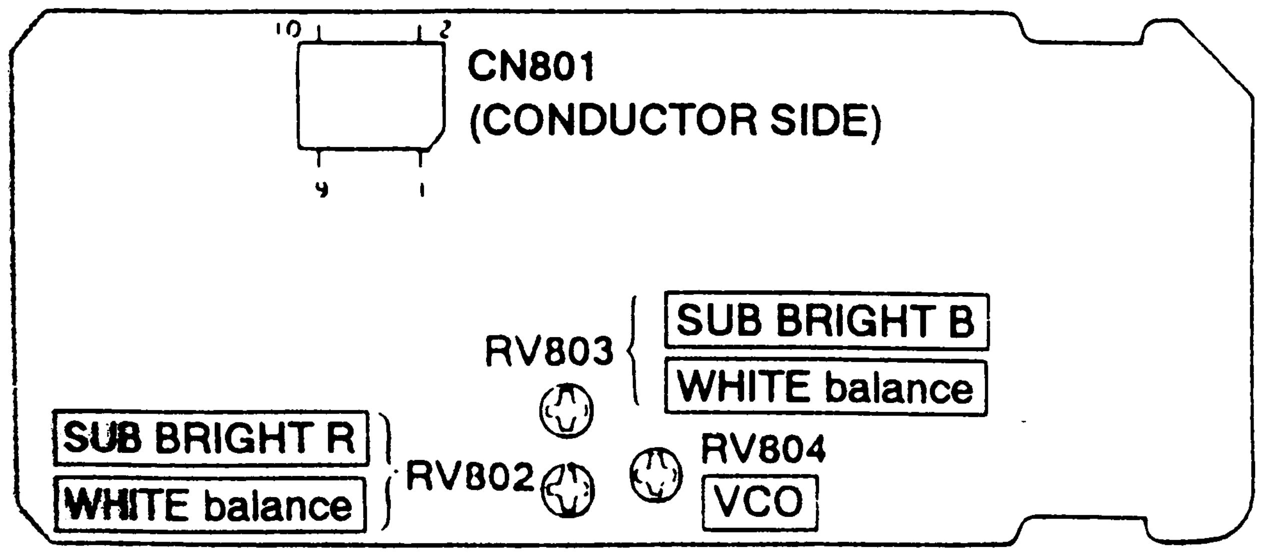
1. Check the GND level of the oscilloscope.
2. Adjust the PCO voltage (A) to the specified value with RV804.



H
A
GND level
(0 Vdc)

Fig. 7-1-25.

VF-68 BOARD (COMPONENT SIDE)



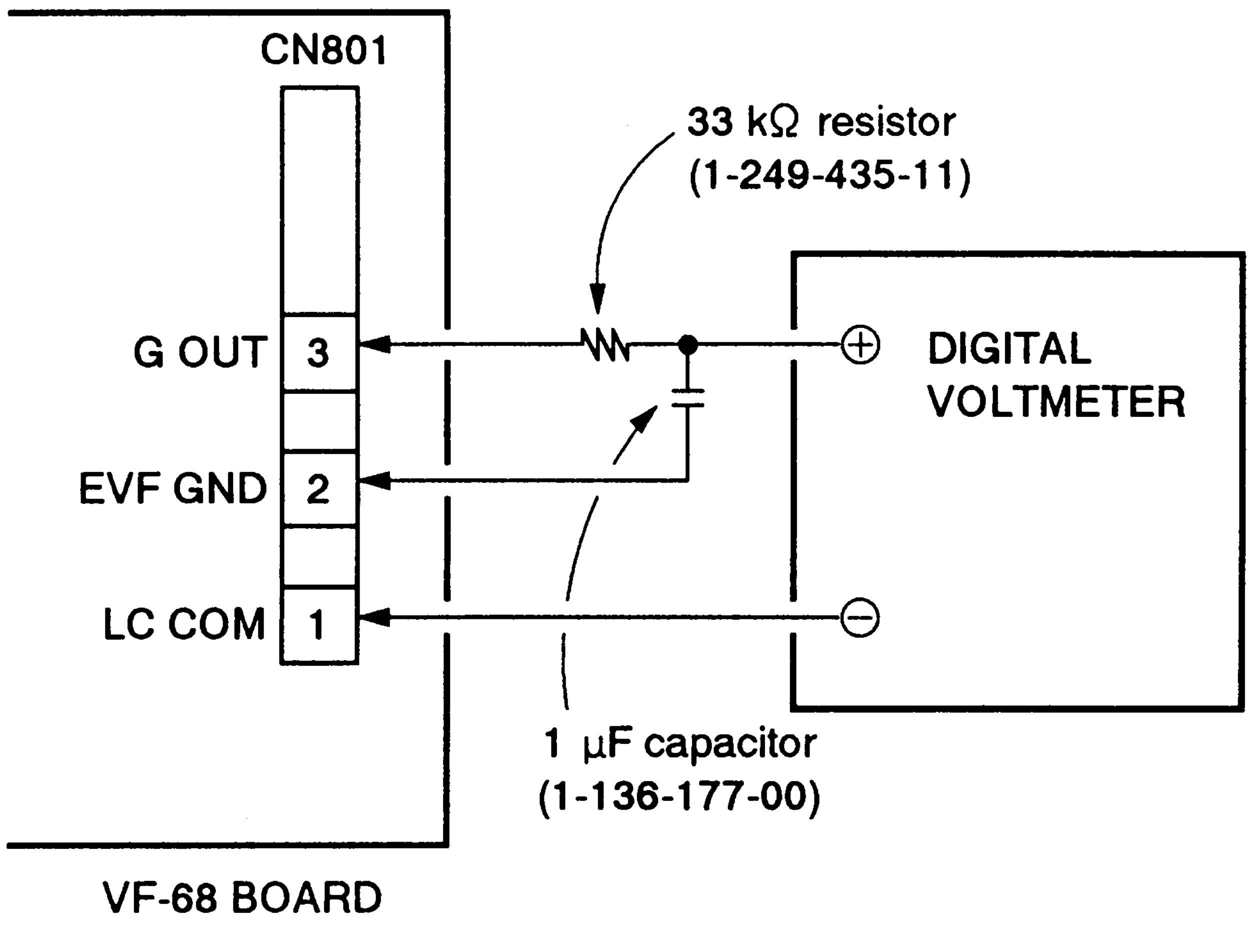
10
2
9
1
CN801
(CONDUCTOR SIDE)
RV803
SUB BRIGHT B
WHITE balance
SUB BRIGHT R
WHITE balance
RV802
RV804
VCO

4. LC COM voltage check (VF-68 Board)

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	+: Pin ③ of CN801 (G OUT) –: Pin ① of CN801 (LC COM)
Measuring Instrument	Digital voltmeter
Specified Value	A=+0.35 ± 0.1 Vdc

Connection:

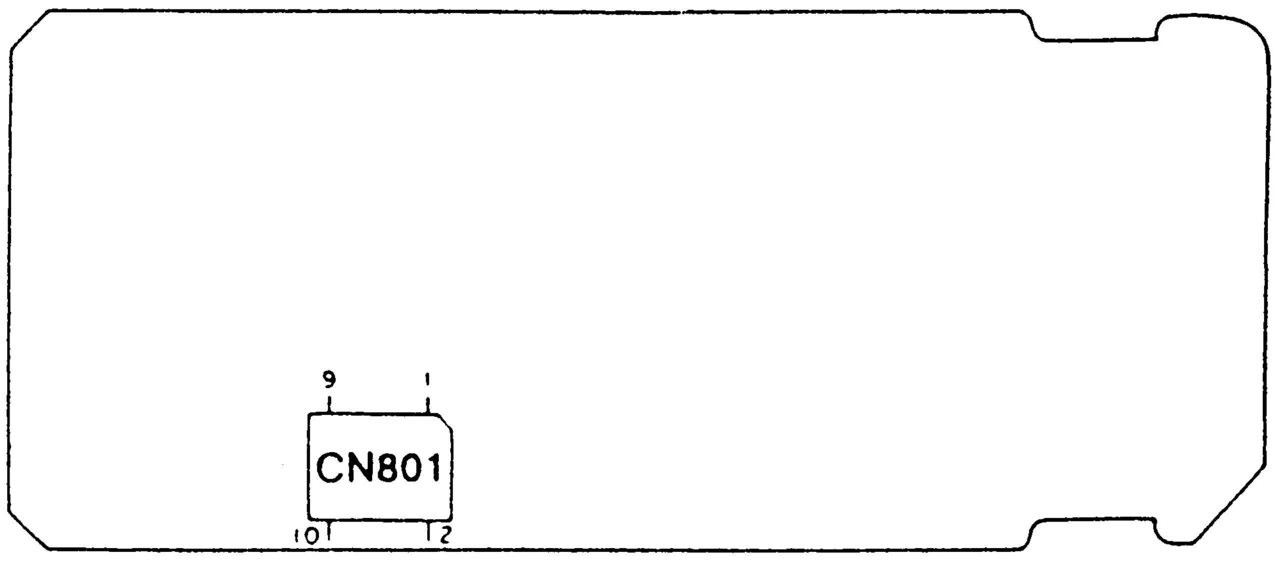
1) Connect the digital voltmeter as shown in the following figure.


CN801
33 kΩ resistor
(1-249-435-11)
G OUT 3
EVF GND 2
LC COM 1
⊕
DIGITAL VOLTMETER
⊖
1 μF capacitor
(1-136-177-00)
VF-68 BOARD

Checking method:

1. Check that the voltage difference (A) satisfies the specified value.

VF-68 BOARD (CONDUCTOR SIDE)


9
1
CN801
10
2

5. BRIGHT adjustment (VF-69 Board)

Adjust to the proper LCD panel driving video signal level.
If it is not correct, the image will be saturated (whitish) or blackish.

Mode	Stop
Signal	No signal
Measurement Point	Pin ③ of CN801 of VF-68 board (G OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV953
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV953.

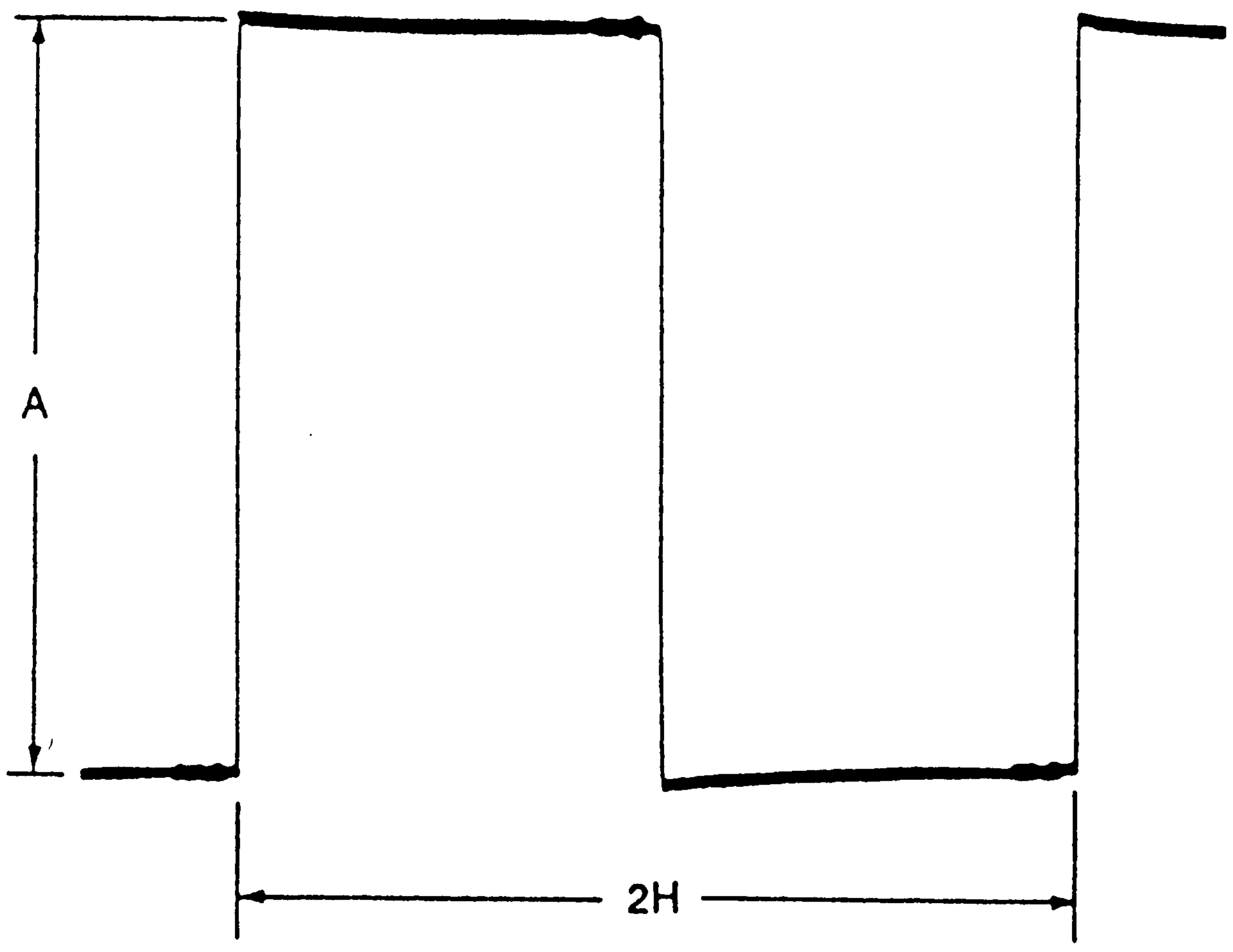
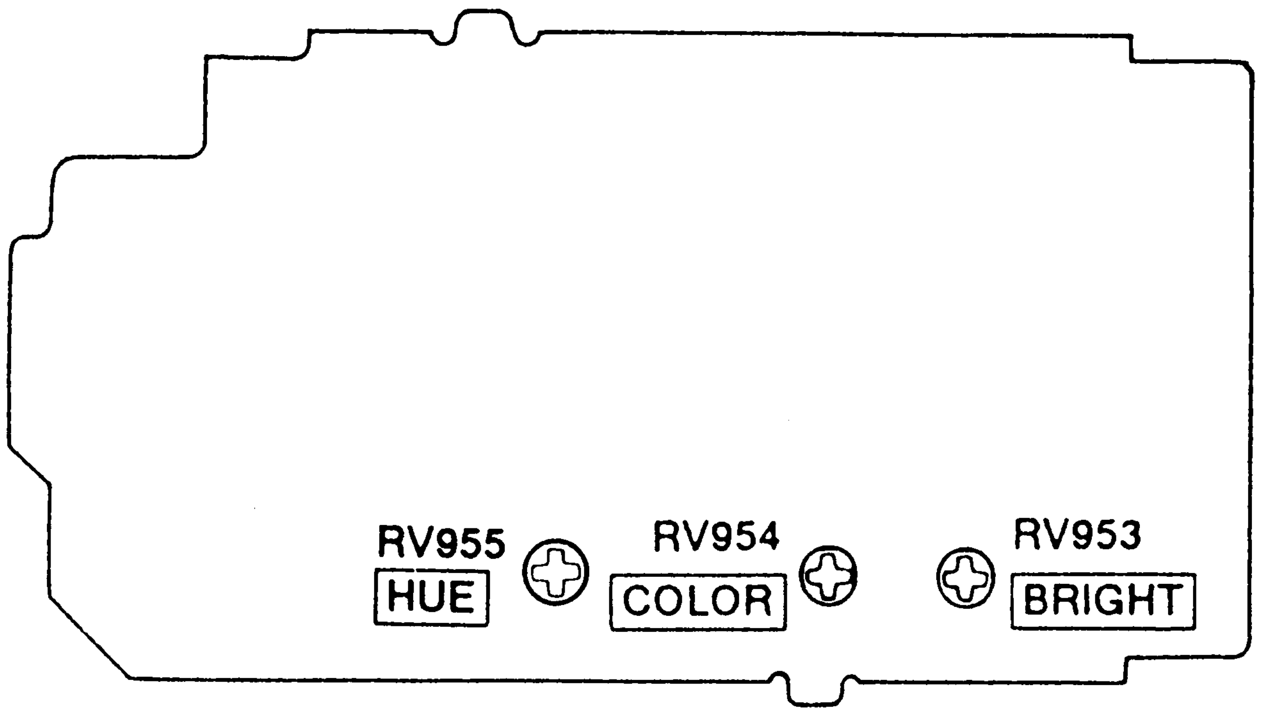


Fig. 7-1-26.

VF-69 BOARD (CONDUCTOR SIDE)


RV955
HUE
RV954
COLOR
RV953
BRIGHT

6. CONTRAST check (VF-68 Board)

Mode	Stop
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Pin ③ of CN801 (G OUT)
Measuring Instrument	Oscilloscope
Specified Value	A=2.3 ± 0.15V

Checking method:

1. Check that the white 100% level (A) is the specified value.

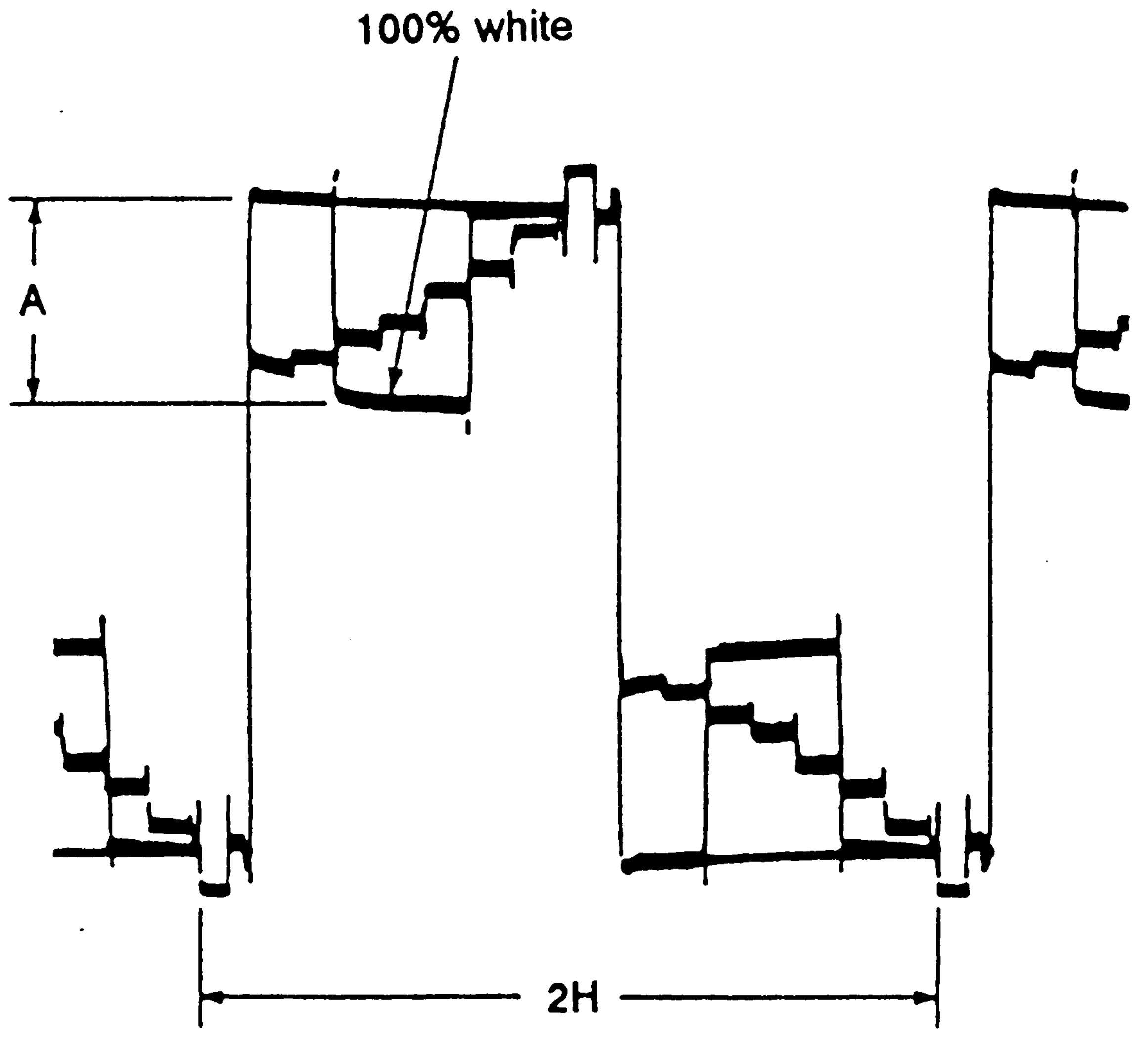
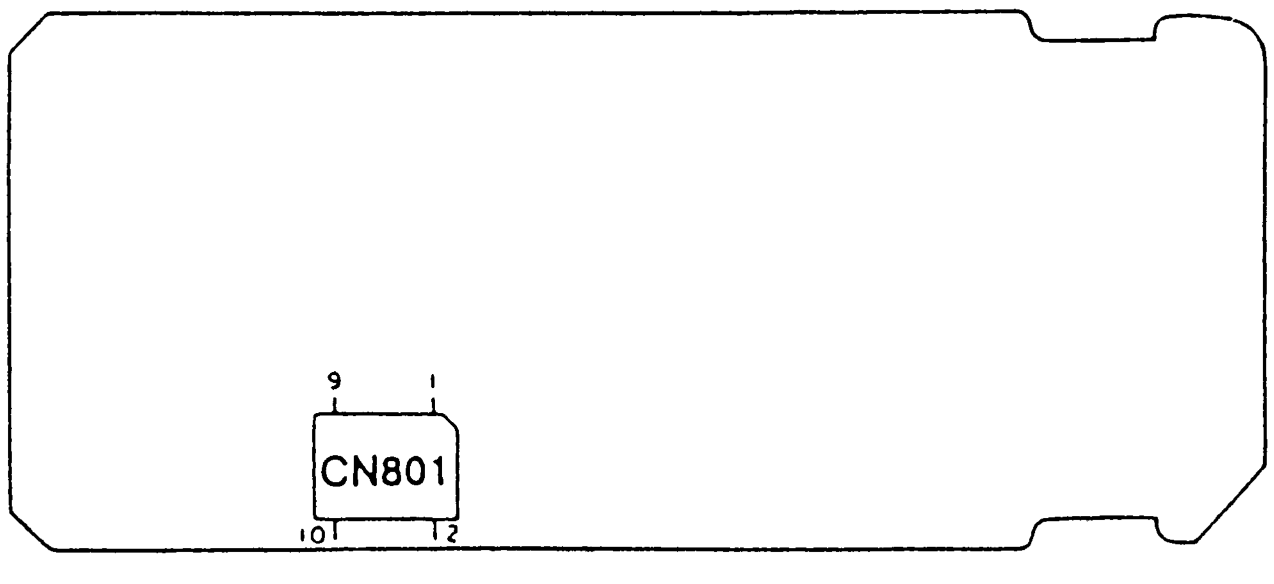


Fig. 7-1-27.

VF-68 BOARD (CONDUCTOR SIDE)


9
1
CN801
10
2

7. SUB BRIGHT R preset adjustment (VF-68 Board)

White balance rough adjustment (1).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑦ of CN801 (R OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV802
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV802.

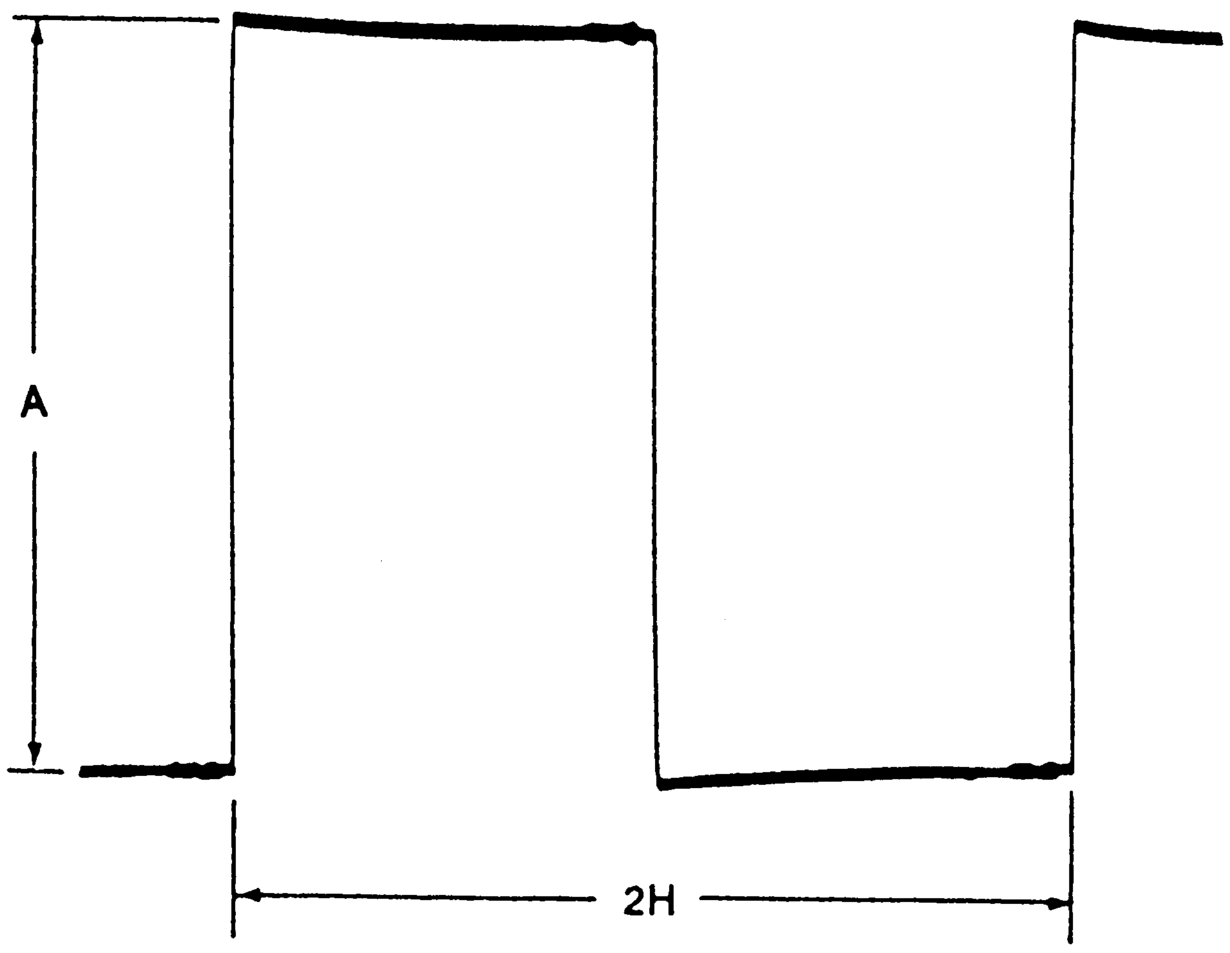
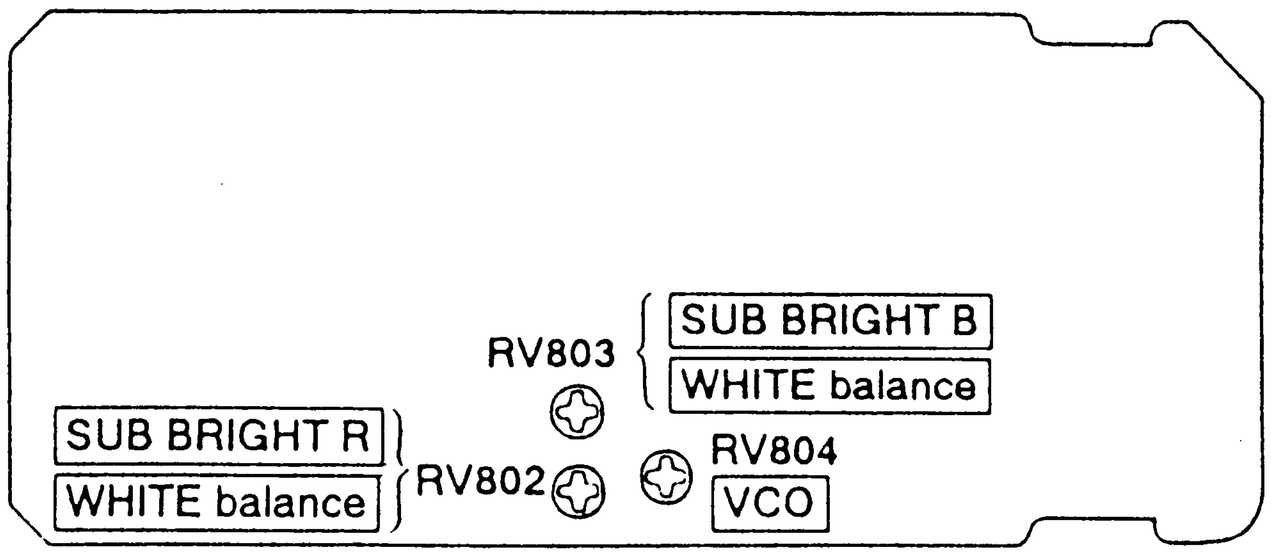


Fig. 7-1-28.

VF-68 BOARD (COMPONENT SIDE)


RV803
SUB BRIGHT B
WHITE balance
SUB BRIGHT R
WHITE balance
RV802
RV804
VCO

8. SUB BRIGHT B preset adjustment (VF-68 Board)

White balance rough adjustment (2).

Mode	Record
Signal	No signal
Measurement Point	Pin ⑧ of CN801 (B OUT)
Measuring Instrument	Oscilloscope
Adjustment Element	RV803
Specified Value	A=7.2 ± 0.1V

Adjusting method:

1. Adjust the potential difference (A) between the reversed waveform pedestal and the non reversed waveform pedestal to the specified value with RV803.

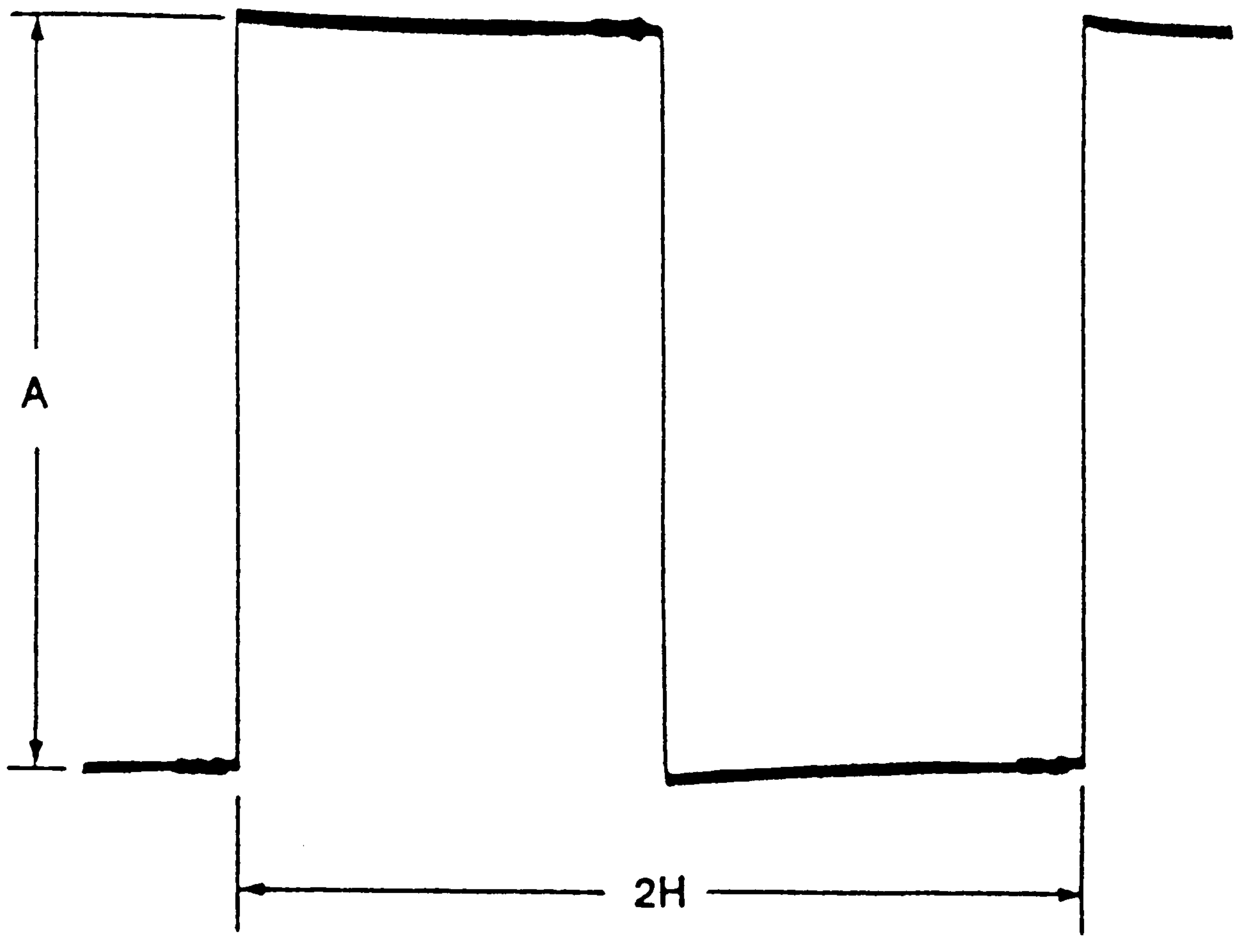


Fig. 7-1-29.

9. White balance adjustment (VF-68 Board)

Adjust to the proper white balance level.

If it is not correct, the color reproducibility of the LCD panel will be poor.

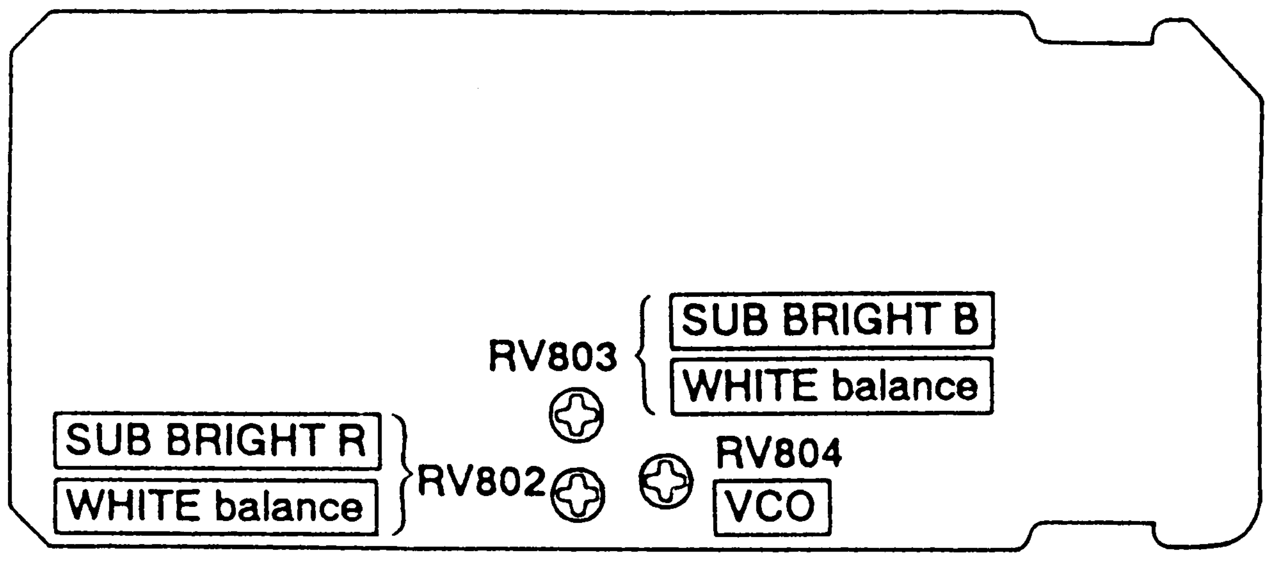
Mode	Record
Signal	Color bar signal whose chroma signal and burst signal are turned off
Measurement Point	Check on LCD display
Measuring Instrument	
Adjustment Element	R: RV802 B: RV803
Specified Value	Picture should not be colored

Note: Turn on the power supply and adjust after more than one minute.

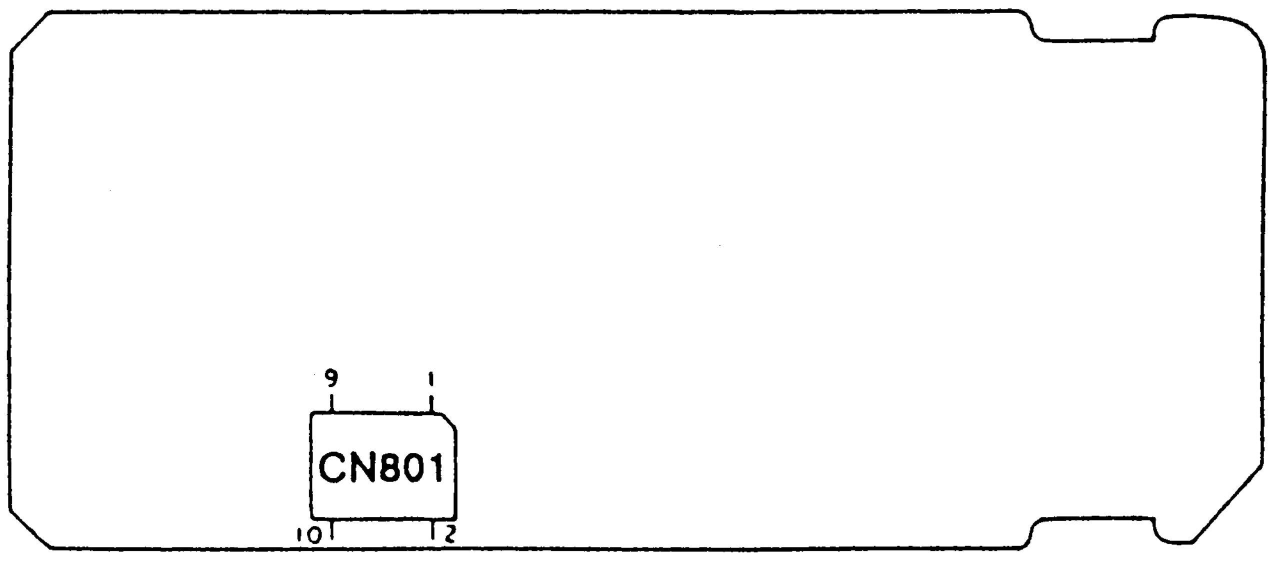
Adjusting method:

1. Check that the LCD display is not colored.
   If it is, adjust RV802 and RV803.

VF-68 BOARD (COMPONENT SIDE)



VF-68 BOARD (CONDUCTOR SIDE)



7-2. MECHANICAL SECTION ADJUSTMENTS

Mechanism Parts Adjustments

For details on the adjustments and checks of mechanical section and replacements of mechanism parts, refer to the separate volume-"8 mm Video Mechanism Adjustment Manual IV A Mechanism ".

2-1. OPERATING WITHOUT A CASSETTE

1) Refer to "2. DISASSEMBLY" and supply the power with the cabinet removed. (So that the mechanical deck can be operated.)
2) Connect the adjusting remote commander to the remote terminal.
3) Turn on the HOLD switch of the adjusting remote commander.
4) Close the cassette compartment without loading a cassette and complete loading.
5) Set data: 01 to page: 1, address: 00.
6) Set data: 01 to page: D, address: 02, and press the PAUSE button of the adjusting remote commander.
7) Set data: 04 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.

By carrying out the above procedure, the unit can be operated without loading a cassette.

Be sure to carry out "Processing after Operations" after checking the operations.

Set the data of page: D, address: 03 to the following if the sensor ineffective mode, forced VTR power supply ON mode or forced camera power supply ON mode are to be used together.

Forced VTR power supply ON mode·········06
Forced camera power supply ON mode······05

[Processing after Operations]

1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page D, address: 02, and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: D, address: 03, and press the PAUSE button of the adjusting remote commander.
4) Set data: 00 to page: 1, address: 00.
5) Disconnect the power supply of the unit.

2-2. TAPE PATH ADJUSTMENT

1. Preparations for adjustments

1) Clean the tape path face (tape guide, drum, capstan shaft, pinch roller).
2) Connect the adjusting remote commander to the remote terminal.
3) Turn on the HOLD switch of the adjusting remote commander.
4) Select page: 1, address: 00, and set data: 01.
5) Select page: D, address: 02, and set data: 03.
   (Perform "Processing after operations" after completing adjustments.)
6) Connect the oscilloscope.
   Channel 1-Pin ③ of CN102 of VS-123 board
   External trigger-Pin ④ of CN102 of VS-123 board
   (Connect the oscilloscope via the measuring pin tool for the video section (J-6082-140-A).)
7) Playback the alignment tape (WR5-1NP) for tracking.
8) Check that the RF waveform of the oscilloscope is flat at both the entrance and the exit.
   If not flat, perform necessary adjustment according to the separate 8 mm Video Mechanical Adjustment Manual IV (A Mechanism).
9) Perform "Processing after operations", after completing adjustments.

CN102 of VS-123 board

1	PB 'CH RF
2	PB PCM RF
3	PB RF
4	RF SWP
5	RP GND
6	REC 2

[Processing after operations]

1) Connect the adjusting remote commander, and turn on the HOLD switch.
2) Select page: 1, address: 00, and set data: 01.
3) Select page: D, address: 02, and set data: 00.
4) Press the PAUSE button of the adjusting remote commander.
5) Remove the power supply from the unit.

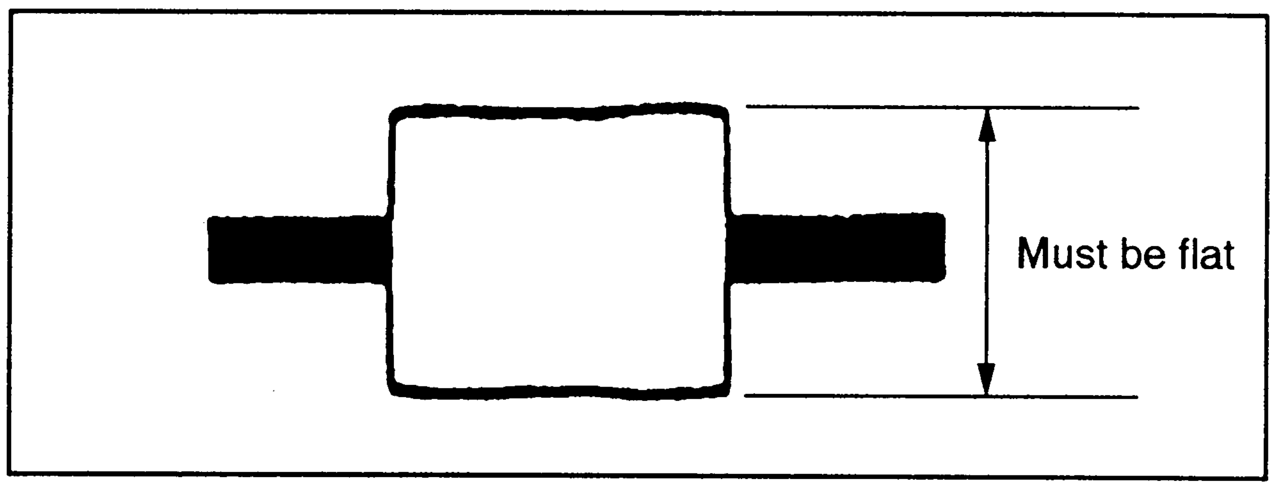


Fig. 7-2-1.

7-3. VIDEO SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 7–60.

3-1. PREPARATIONS BEFORE ADJUSTMENT

The following adjusting instruments are used for adjusting the video section.

3-1-1. Equipments to be Used

1) TV monitor
2) Oscilloscope: 2 phenomena, band 30 MHz or wider, with delay mode. (Use a 10:1 probe unless specified otherwise.)
3) Frequency counter
4) Pattern generator with video output terminal
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuater
10) Regulated power supply
11) Alignment tape
    For tracking adjustment (WR5-1NP)
    Part Code: 8-967-995-02
    For video frequency characteristics adjustment (WR5-6N)
    Part Code: 8-967-995-12
    For checking operations
    (WR5-4NL)$^{\text{Note 1}}$
    Part Code: 8-967-995-51
    (WR5-5NSP)$^{\text{Note 2}}$
    Part Code: 8-967-995-42
    Note: The following alignment tapes can also be used.
    1) WR5-3NL (8-967-995-31)
    2) WR5-4NSP (8-967-995-41)
12) Remote commander for adjustment (J-6082-053-A)
13) VC-159 board extension cord (42P, 0.8 mm)
    Part Code: J-6082-285-A
14) Control switch block (FK board) extension cord (9P, 0.8 mm)
    Part Code: J-6082-288-A
15) Control switch block (CK board) extension cord (18P, 0.8 mm)
    Part Code: J-6082-289-A

3-1-2. Adjusting Precautions

1) The adjustment for this unit is performed using the VIDEO input (VIDEO terminal input) or the camera input. The camera input can be used for video adjustments only. Use the VIDEO input for the other adjustments.
   When using the VIDEO input, set the power supply switch to "PLAYER" or set the "forcible VTR power supply ON mode" using the adjusting remote commander. (Note 1).
   When using the camera input, set the power supply switch to "CAMERA" or set the "Forcible camera+VTR power supply ON mode" using the adjusting remote commander (Note 2).
   After completing adjustments, be sure to exit the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode" (Note 3).
2) The F panel block (microphone) is not used for video adjustments. Disconnect the following connector in these adjustments.
   1. CN003 of the MA-230 board (2P, 1.5 mm)
3) MA-230 board is required only for audio adjustments. When not using it, disconnect the following connector.
   1. CN402 of the AU-182 board (8P, 0.8 mm)
4) The view finder (VF board) is not used for video adjustments. Disconnect the following connector in these adjustments.
   1. CN206 of the VS-123 board (6P, 0.5 mm)
5) The cabinet (R) (CK board: Power supply switch, camera function switch) need not be connected if the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode" is set. In this case, disconnect the following connectors.
   1. CN503 of the VS-123 board (18P, 0.8 mm)
   2. CN101 of the ZB-2 board (4P, 0.8 mm)
   However, as disconnecting these connectors means disconnecting the 3V lithium power supply, data set by the user such as the date, time, and menu will be lost. After completing the adjustments, set these data again, and be sure to exit the "forcible VTR power supply ON mode" or "forcible camera+VTR power supply ON mode". (Note 3)
   When connecting the cabinet (R) using the extension cord, use the following type.
   1. J-6080-289-A (18P, 0.8 mm)

6) The lens block and VC-159 board are not used for video adjustments. Disconnect the following connectors in these adjustments.
   1. CN203 of the VS-123 board (42P, 0.8 mm)

   Connect the following when removing the VC-159 board.
   1. Connect Pin ㉒ (REG H) and Pin ⑦ (D3.6V) of CN203 of the VS-123 board with a jumper wire.

   When connecting the VC-159 board using the extension cord, use the following type.
   1. J-6080-285-A (42P, 0.8 mm)
7) The audio board (AU-182 board) is required only for audio adjustments. When not using it, disconnect the following connector.
   1. CN202 of the VS-123 board (24P, 0.8 mm)
8) When opening the VS-123 board, disconnect the following connectors.
   1. CN502 of the VS-123 board (9P, 0.8 mm)

   The VTR function keys will not work. Use the remote commander to perform operations other than EJECT.
   When connecting the FK board and CN502 of VS-123 board using the extension cord, use the following type.
   1. J-6080-288-A (9P, 0.8 mm)

Note 1: Setting the "forcible VTR power supply ON mode (VIDEO input mode)"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 02 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.

By performing the above, the VTR can be operated with the cabinet (R) removed. After completing adjustments, be sure to exit the "forcible power supply ON mode".

Note 2: Setting the "forcible camera+VTR power supply ON mode (camera input mode)"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 03 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.

By performing the above, the VTR can be operated with the cabinet (R) removed. After completing adjustments, be sure to exit the "forcible power supply ON mode".

Note 3: Exiting the "forcible power supply ON mode"
1) Set data: 01 to page: 1, address: 00.
2) Set data: 00 to page: D, address: 03 and press the PAUSE button of the adjusting remote commander.
3) Set data: 00 to page: 1, address: 00.

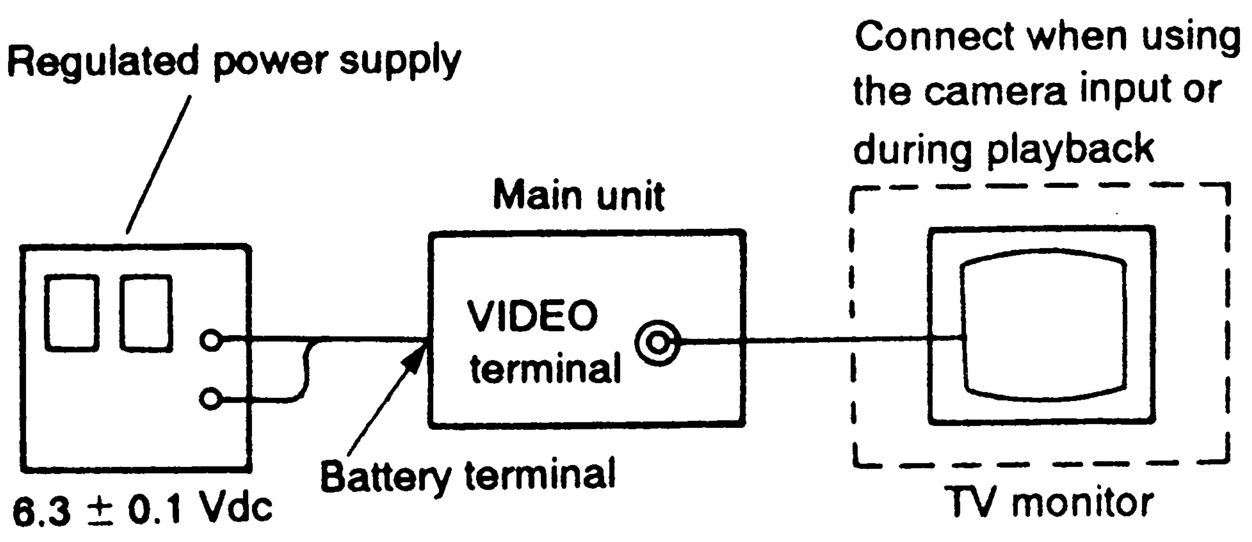
3-1-3. Connecting the Equipments

Connect the measuring instruments as shown in Fig. 7-3-1. according to the input terminal specifications (VIDEO input or CAMERA input), and perform the adjustments.
The input terminal is specified in the ( ) in the signal column. Either input terminal can be used when there are no specifications.

Note 1: If the VIDEO input is used for the adjustments which specify for the CAMERA input to be used, the product specifications of the unit may not be satisfied in some cases. Be sure to perform according to the specifications.

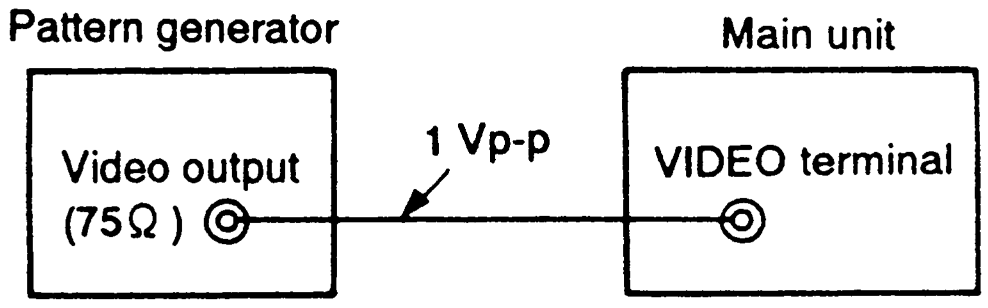
Note 2: When adjustments are performed with the S video output terminal VTR as the signal source, the efficiencies of the unit may be affected by VTR. It is recommendet that a pattern generator with a Y/C separation output terminal be used as much as possible.

Connecting the TV monitor and regulated power supply


Regulated power supply
Connect when using the camera input or during playback
Main unit
VIDEO terminal
Battery terminal
6.3 ± 0.1 Vdc
TV monitor

Connecting the pattern generator

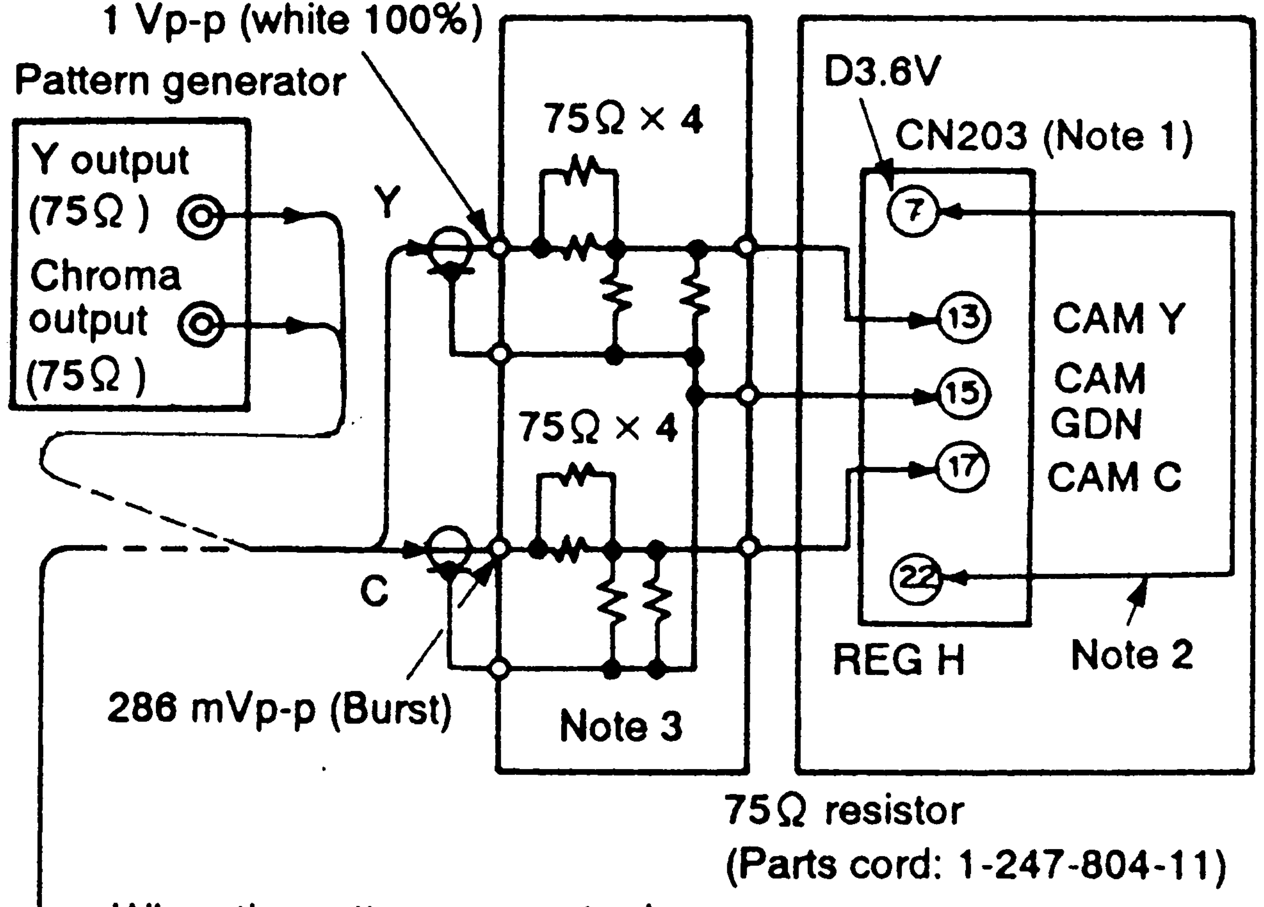
[VIDEO Input]
Set the power supply switch to "PLAYER" or set the "forcible VTR power supply ON mode" using the adjusting remote commander.


Pattern generator
Main unit
Video output (75Ω)
1 Vp-p
VIDEO terminal

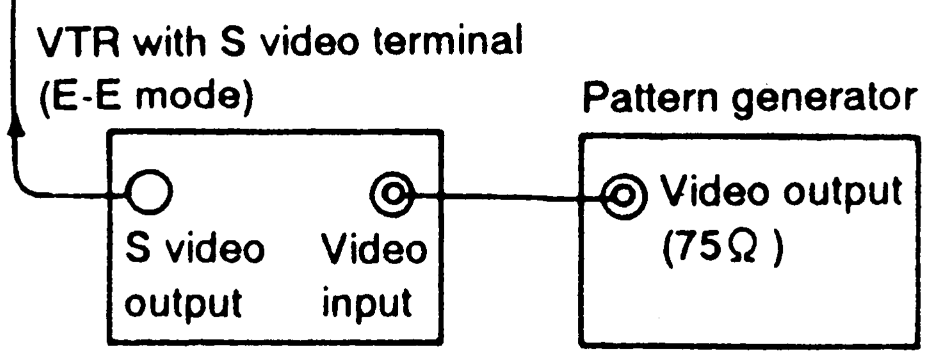
Note: The TV monitor cannot be connected.
Use the view finder to monitor.

[CAMERA Input]
Set the power supply switch to "CAMERA" or set the "forcible camera+VTR power supply ON mode" using the adjusting remote commander.

- When the pattern generator has a Y/C separation output terminal


VS-123 board
1 Vp-p (white 100%)
Pattern generator
Y output (75Ω)
Chroma output (75Ω)
Y
75Ω × 4
75Ω × 4
C
286 mVp-p (Burst)
Note 3
D3.6V
CN203 (Note 1)
7
13
15
17
22
CAM Y
CAM GDN
CAM C
REG H
Note 2
75Ω resistor
(Parts cord: 1-247-804-11)

- When the pattern generator has no Y/C separation output terminal


VTR with S video terminal
(E-E mode)
Pattern generator
S video output
Video input
Video output (75Ω)

Note 1: Remove the VC-159 board.
Note 2: Connect Pins ⑦ and ㉒ of CN203 with the jumper wire.
Note 3: The chroma signal input is not required for some adjustments.

Fig. 7-3-1.

3-1-4. How to Set the REC Mode

1) REC key forbidden accept mode cancel
   1. Connect the adjusting remote commander to the remote terminal.
   2. Turn on the power.
   3. Turn on the HOLD switch of the adjusting remote commander.
   4. Select the page: 1 address: 00, and set the data to 01.
   5. Select the page: D address: 17, and set the data to 12.
   6. Press PAUSE button on the adjusting remote commander.

The REC key is accepted through the above procedure.

2) REC mode setting
   1. Turn off the HOLD switch of the adjusting remote commander.
   2. Press REC buttons of the adjusting remote commander.
   3. Perform "3. Procedure after completed the adjustment", after completing adjustment.

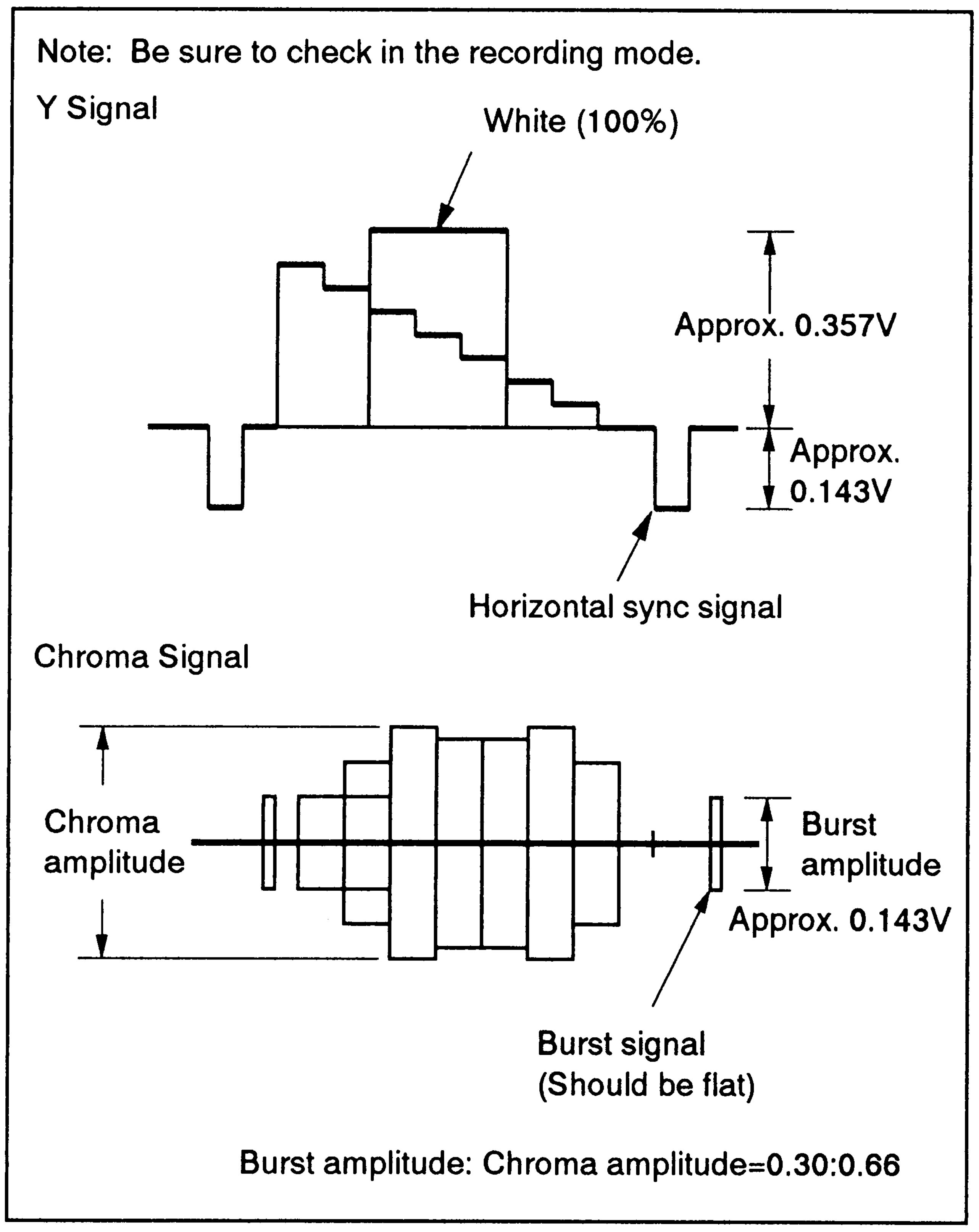
3) Procedure after completed the adjustment
   Be sure to return the mode to REC key forbidden accept mode after adjustment.
   1. Connect the adjusting remoter controller.
   2. Turn on the power.
   3. Turn on HOLD switch of the adjusting remote commander.
   4. Select the page: 1 address: 00, and set the data to 01.
   5. Select the page: D address: 17, and set the data to 02.
   6. Press PAUSE button on the adjusting remote commander.
   7. Turn off the power.

3-1-5. Checking the Input Signals

Because the video signal obtained from the pattern generator is used as the adjustment signal for adjusting the VTR section, the video output signal must satisfy the given specifications.

1. CAMERA Input

Connect the oscilloscope to Pin ⑬ of CN203 on VS-123 board, and check that the sync signal of the Y signal is approximately 0.143 Vp-p and that the amplitude of the video section is approximately 0.357 Vp-p. (When a VTR with the S VIDEO output terminal is used, also check that the chroma signal and burst signal have not remained.) Connect the oscilloscope to Pin ⑰ of CN203 on VS-123 board, and check that the burst signal amplitude of the chroma signal is approximately 0.143 Vp-p and flat, and that the amplitude ratio of the burst signal to the chroma signal is 0.30 : 0.66. The Y and chroma signals used in the adjustment are shown in Fig. 7-3-2.


Note: Be sure to check in the recording mode.

Y Signal
White (100%)
Approx. 0.357V
Approx. 0.143V
Horizontal sync signal
Chroma Signal
Chroma amplitude
Burst amplitude
Approx. 0.143V
Burst signal (Should be flat)

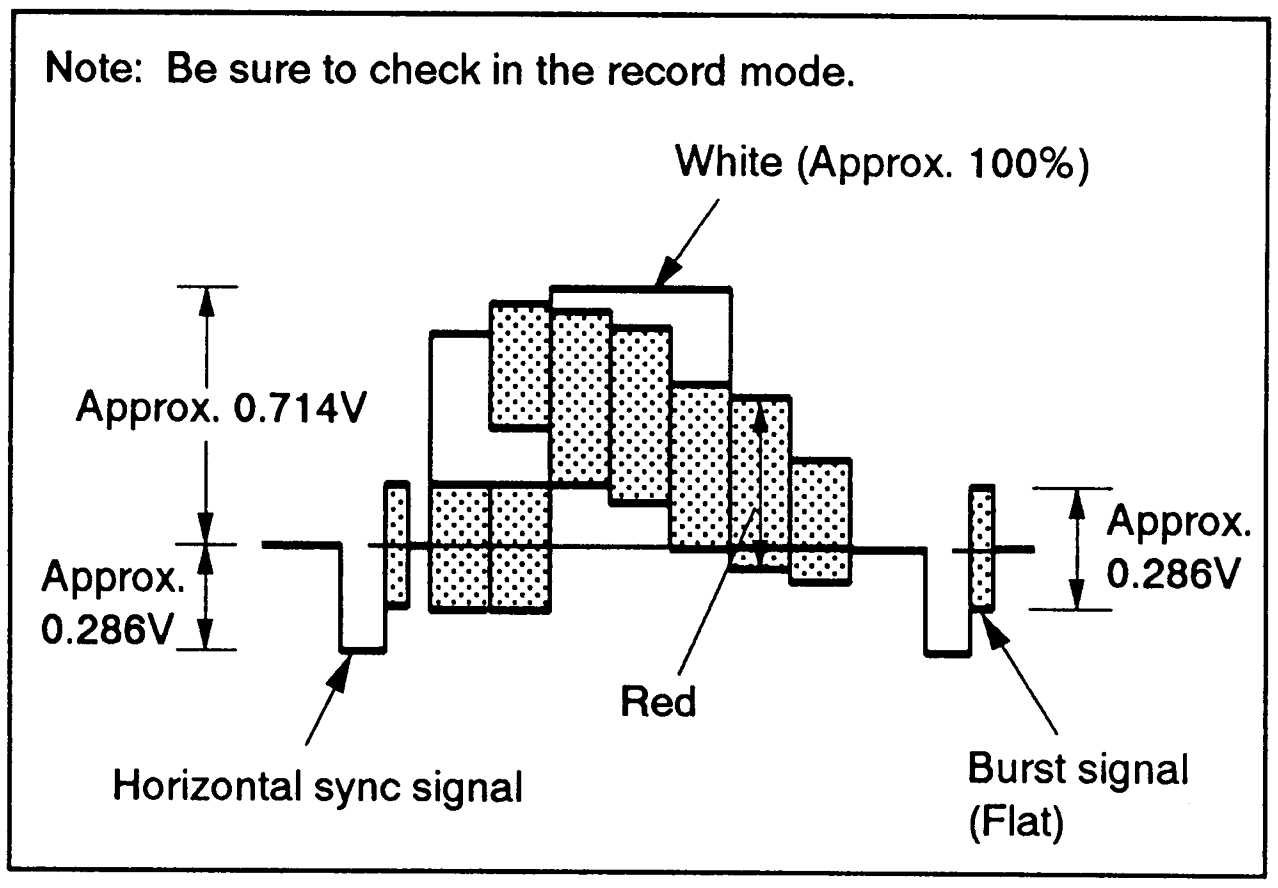
Burst amplitude: Chroma amplitude=0.30:0.66

Fig. 7-3-2. Color bar signal of pattern generator

2. VIDEO Input

Connect the oscilloscope to the video terminal, and check that the sync signal amplitude of the video signal is approximately 0.286V, the amplitude of the video section is approximately 0.714V, the amplitude of the burst signal is approximately 0.286V and flat, and that the level ratio of the burst signal to the "red" signal is 0.30 : 0.66.

The video signal (color bar) used for adjusting the VTR section is shown in Fig. 7-3-3.


Note: Be sure to check in the record mode.

White (Approx. 100%)
Approx. 0.714V
Approx. 0.286V
Approx. 0.286V
Red
Horizontal sync signal
Burst signal (Flat)

Fig. 7-3-3. Color Bar Signal of Pattern Generator

3-1-6. Alignment Tape

The following table lists alignment tapes which are available. Use the tape specified in the signal column for each adjustment.

If the type of tape to be used for checking operations is not specified, use whichever type.

Name	Recording mode	Tape type	Tape speed	Usage
Tracking WR5-1NP	Normal	MP	SP	Tape path adjustment Switching position adjustment
Video frequency characteristics WR5-6N	Normal	MP	SP	Frequency characteristics adjustment
Operation check (SP mode) WR5-5NSP	Normal	MP	SP	Checking operations
Operation check (LP mode) WR5-4NL	Normal	MP	LP	

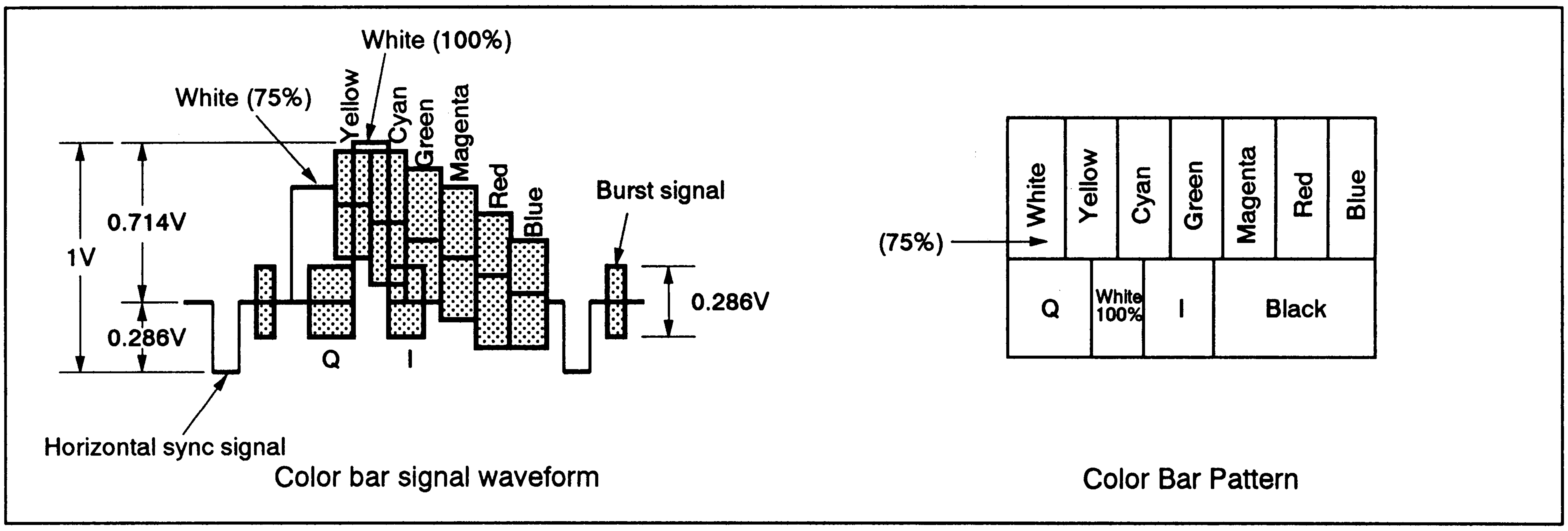
Tape type

MP············ Particle type metal tape
ME············ Evaporated type metal tape

Table 7-3-1.

Fig. 7-3-4. shows the 75% color bar signals recorded on the alignment tape.

Note: Measure using the video output terminal (Terminated at 75 Ω)


White (100%)
White (75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst signal
0.714V
1V
0.286V
0.286V
Q
I
Horizontal sync signal
White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
Q
White 100%
I
Black

Color bar signal waveform

Color Bar Pattern

Fig. 7-3-4. Color Bar Signals of the Alignment Tape

3-1-7. Output Level and Impedance

AV output	Mini jack
Video output	Phono-jack, 1 Vp-p, 75Ω , unbalanced, sync negative
Audio output	Phono-jack, –7.5 dBs, (at load impedance 47 kΩ) impedance less than 2.2 kΩ

3-1-8. Service Mode

Note: After the completion of the all adjustments, cancell the service mode by either of the following ways.

1) Unplug the main power supply and remove the lithium battery. (In this case, date and time and menu setting have been set by users are canceled. Perform resetting.)
2) Return data of the address: 00 on page: 1 to 00. And when data on page: 2 is changed, return the data to the original condition.

1. Test mode setting

Set/release each test mode. Set data: 01 to page: 1, address: 00, before setting the data.

Page D	Address 02

Data	Function
00	Normal
01	Test mode 1 Various emergency prohibitions and releases Drum, capstan, loading motor, reel, tape top and end, DEW SP/LP automatic discrimination prohibition, manual switching, 5 minutes pause release prohibition Power off prohibition/release by battery end

Page D	Address 03

Data	Function
00	Normal
01	Camera power ON
02	VTR power ON
03	Camera + VTR power ON

- * For page D, the data set will be recorded in the nonvolatile memory by pressing the PAUSE button on the adjusting remote commander. Take note that, in this case, the test mode will not be released even if the main power has been turned off (6.3 Vdc).
- * Be sure to return this address data to 00 after completing adjustments/repairs and press the PAUSE button of the adjusting remote commander.

2. Emergency code

Fault (error) symptoms can be checked.

Page D	Address E4

Last emergency code
……Last error code generated (This data will be renewed each time an error occurs.)

Page D	Address E8

2nd emergency code
……2nd error code generated

Page D	Address EC

First emergency code
……First error code generated

- * Be sure to rewrite the data of addresses E4, E8 and EC to 00 after repairs/adjustments.
- * When rewriting the data, be sure to press the PAUSE button of the remote commander after setting the data.

Code	Error Condition
00	No error
01	Loading motor error
02	Reel error during unloading
03	Reel errors at other times
04	Capstan error
05	FG error during drum start up
06	PG error during drum start up
07	FG error during normal drum conditions
08	PG error during normal drum conditions
09	Phase error during normal drum conditions

3. Emergency mode

The operation mode can be checked during faults.

Page D	Address E5

Last emergency mode
……The operation mode when the last error is generated
(This data will be renewed each time an error occurs.)

Page D	Address E9

2nd emergency mode
……The operation mode when the 2nd error is generated

Page D	Address ED

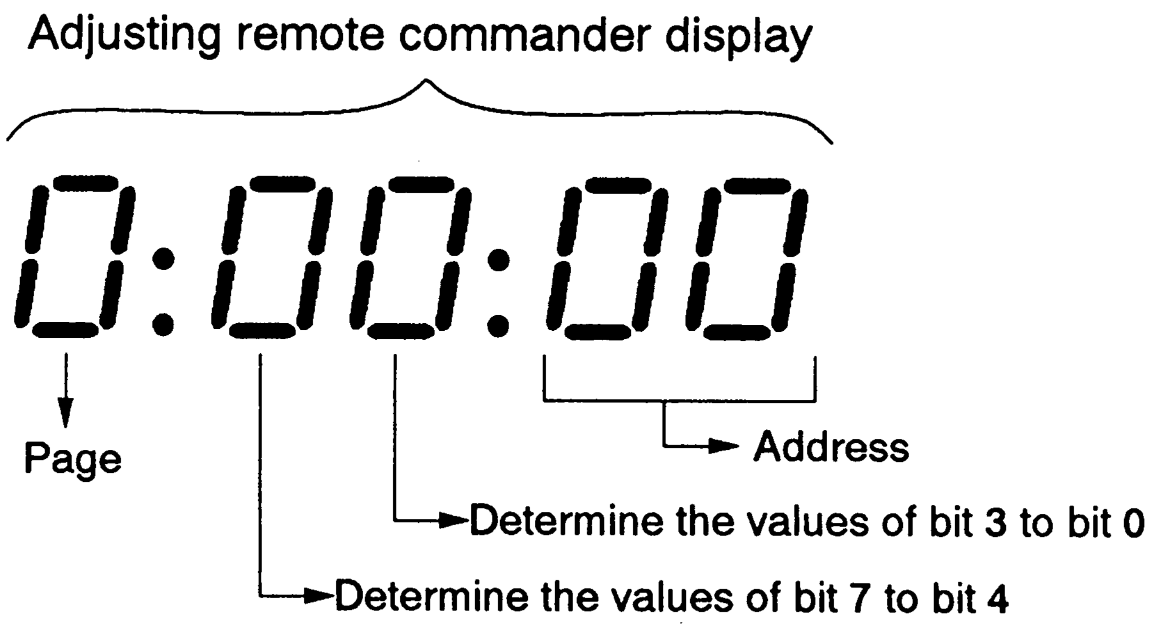
First emergency mode
……The operation mode when the first error is generated

- * Be sure to rewrite the data of addresses E5, E9 and ED to 00 after repairs/adjustments.
- * When rewriting the data, be sure to press the PAUSE button of the adjusting remote commander after setting the data.

Code	Error Conditions
00	BEFOR INITIALIZE
01	EJECTED
02	NORMAL STOP
03	FF
04	NORMAL REC
06	NORMAL PB
07	PB PAUSE
12	LOADING
14	REC PAUSE
26	X1
27	1/5 SLOW
31	UNLOADING
46	CUE
56	REVIEW
62	STOP TAPE END
66	X2
67	FRAME
72	STOP TAPE TOP
83	REWIND
85	REC REVIEW (+)
95	REC REVIEW (–)
97	–PB PAUSE
A2	EMERGENCY LOADING
A5	EDIT SEARCH (+)
B1	EMERGENCY UNLOADING
B2	STOP EMERGENCY 1
B5	EDIT SEARCH (–)
C2	STOP EMERGENCY 2
E2	STOP NO CASSETTE
F5	EDIT PAUSE

4. Bit value discrimination

Bit values must be discriminated using the display data of the adjusting remote commander for the following items. Use the table below to discriminate if the bit value is "1" or "0".


Adjusting remote commander display
0:00:00
Page
Address
Determine the values of bit 3 to bit 0
Determine the values of bit 7 to bit 4

	Remote controller display	Bit value			
		bit 3 or bit 7	bit 2 or bit 6	bit 1 or bit 5	bit 0 or bit 4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ→	8	1	0	0	0
	9	1	0	0	1
	A(A)	1	0	1	0
	B(b)	1	0	1	1
	C(c)	1	1	0	0
	D(d)	1	1	0	1
Ⓑ→	E(E)	1	1	1	0
	F(F)	1	1	1	1

(Example) If the remote commander display data is "8E", bit values from bit7 to bit4 can be discriminated from column Ⓐ, and those from bit3 to bit0 from column Ⓑ.

5. Battery voltage check

Page 2	Address 47

Display Data	Battery Voltage
F0	Approx. 10.6 Vdc
E0	Approx. 9.9 Vdc
D0	Approx. 9.2 Vdc
C0	Approx. 8.5 Vdc
B0	Approx. 7.8 Vdc
A0	Approx. 7.1 Vdc
90	Approx. 6.4 Vdc
80	Approx. 5.7 Vdc
70	Approx. 5.0 Vdc

Using method:

Order	Page	Address	Data	Procedure
1	2	00	01	Preparation
2	2	47		The battery voltage can be discriminated by the display data.

* Voltage measurement accuracy is approx. ± 10%.

6. Mechanism controller input/output check

Page 2	Address 83

Bit	IN/OUT Signal	Condition
0		
1	E/L DET	"1"=Hi8, "0"=Normal
2	SP/LP DET	"1"=SP, "0"=LP
3	CLOG DET	"1"=Clog detected, "0"=Others
4	REC PROOF	"1"=Recording prohibited, "0"=Recording possible
5	TAPE PREEND	"1"=Tape preend, "0"=Others
6	DEW DET	"0"=Condensation occured, "1"=Others
7	CASSETTE IN	"0"=No cassette

Using method:

Order	Page	Address	Data	Procedure
1	2	00	00	Preparation
2	2	83		The condition of each input signal can be discriminated by differentiating the bit value of the display data.

Page 2	Address 84

Bit	IN/OUT Signal	Condition
0	VA PB MODE	"1"=PB, "0"=REC
1	RP PB MODE	"1"=PB, "0"=REC
2	JOG	"1"=Variable speed playback, "0"=Others
3	ME/MP SW	"1"=ME tape, "0"=Other tape
4	Hi8 MP SW	"1"=Hi8 MP tape, "0"=Other tape
5	SERVO OPERATION	"1"=SP mode, "0"=LP mode
6	VIDEO MUTE	"1"=Mute, "0"=Video output
7	AUDIO MUTE	"1"=Mute, "0"=Audio output

Using method:

Order	Page	Address	Data	Procedure
1	2	00	00	Preparation
2	2	84		The condition of each signal can be discriminated by differentiating the bit value of the display data.

7. Mode switch and CC DOWN switch check

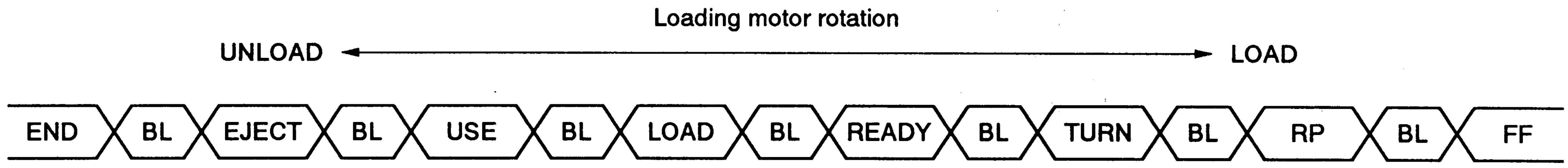
The mode switch position (mechanical section condition) can be checked.

Page 3	Address E9

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
MSW 2	MSW 1	MSW 0	CC DOWN				

				DATA	POSITION	FUNCTION
0	0	0	0/1	E*/F*	BL	Interval of each position
0	1	1	1	7*	END	FULL END processing (T side lock removal)
0	0	1	1	3*	EJECT	Cassette compartment ejection
1	0	1	1	B*	USE	EJECTED (Unskate end)
0	0	1	0	2*	LOAD	LOADING (Skate in)
1	0	0	0	8*	READY	NORMAL STOP position
1	1	0	0	C*	TURN	OFF of pinch roller only with STOP↔FF/REW (oscillating position)
0	1	0	0	4*	RP	PB, REC, RVS, REV, CUE
0	0	0	0	0*	FF	FF/REW

*: Don't care


Loading motor rotation
UNLOAD
LOAD
END
BL
EJECT
BL
USE
BL
LOAD
BL
READY
BL
TURN
BL
RP
BL
FF

Using method:

Order	Page	Address	Data	Procedure
1	3	00	00	Preparation
2	3	E9		The mode switch position and CC DOWN switch condition can be discriminated by the display data.

8. Tape top/end sensor check

Page 3	Address 0A

Display Data	Tape Top/End Sensor Condition
00	Tape present (Middle of tape)
01	Tape end
10	Tape top
11	No tape

Tape end sensor condition
Tape top sensor condition

"0"=Non active (Not receiving light)
"1"=Active (Receiving light)

Using method:

Order	Page	Address	Data	Procedure
1	3	00	02	Preparation
2	3	0E	10	Preparation
3	3	0A		The condition of the tape top/end sensor can be discriminated by the display data.

9. Version of mechanical control microprocessor

Page 3	Address 0B

Display Data	Microprocessor version
01	Version 1

Using method:

Order	Page	Address	Data	Procedure
1	3	00	02	Preparation
2	3	0B		The microprocessor version can be discriminated by the display data.

10. Page D address list

Note 1: The adjustment data initial value is the data input before performing video section adjustments (Page D) if the Page D data has been erased due to some reason.

Note 2: The data written in the adjustment data memo column are fixed.
After adjusting, check that these data have not been rewritten by mistake.

Note 3: In some case, data have been input to the page D address 91 to D3 and F0 to FF. This has no relation to the adjustment.

Address	Adjustment data	
	Initial value	Memo column
00		
01		
02	00	00
03	00	00
04	80	
05	0B	
06	66	
07	7F	
08	84	
09	8A	
0A	8E	
0B	00	00
0C		
0D		
0E		
0F		
10	00	00
11	00	00
12	00	00
13	00	00
14	95	95
15	77	77
16	01	01
17	02	02
18	05	05
19	40	40
1A	48	48
1B	20	20
1C	00	00
1D	00	00
1E		
1F		

Table 7-3-2. (1)

Address	Adjustment data	
	Initial value	Memo column
20		
21		
22		
23	00	00
24	00	00
25	00	00
26	14	14
27	14	14
28	64	64
29	64	64
2A	6E	6E
2B	6E	6E
2C	64	64
2D	64	64
2E	6E	6E
2F	6E	6E
30	DC	DC
31	DC	DC
32	DC	
33	DC	
34	DC	DC
35	DC	DC
36	DC	
37	DC	
38	E4	
39	EB	
3A	E4	
3B	EB	
3C		
3D		
3E		
3F		
40	A9	
41	A9	
42	A9	
43	A9	
44	A9	
45	A9	
46	A9	
47	A9	
48		
49		

Table 7-3-2. (2)

Address	Adjustment data	
	Initial value	Memo column
4A		
4B		
4C		
4D		
4E		
4F		
50	A2	A2
51	A1	A1
52		
53		
54	00	00
55	00	00
56	90	90
57	00	00
58	00	00
59	75	75
5A	E6	E6
5B	E6	E6
5C	E6	E6
5D	E6	E6
5E	E6	
5F	E2	E2
60	E2	E2
61	E2	E2
62	E2	E2
63	E2	
64		
65		
66		
67		
68		
69	E6	E6
6A	E6	E6
6B	E6	E6
6C	E6	E6
6D	E6	E6
6E		
6F		
70	8E	
71	95	
72	B0	B0
73	B0	B0

Table 7-3-2. (3)

Address	Adjustment data	
	Initial value	Memo column
74	FF	FF
75	BB	
76	FF	FF
77	97	
78	00	00
79	00	00
7A	86	86
7B	86	86
7C	00	00
7D	00	00
7E	00	00
7F	00	00
80	99	
81	99	
82	A5	
83	A9	
84		
85	69	69
86	00	00
87	69	
88	B5	B5
89	B5	B5
8A	00	00
8B	48	48
8C	AF	
8D	AF	
8E	AF	
8F	AF	
90	60	60
91 to D3		
D4		
D5		
D6		
D7		
D8		
D9		
DA		
DB		
DC		
DD		
DE		
DF		

Table 7-3-2. (4)

Address	Adjustment data	
	Initial value	Memo column
E0		
E1		
E2		
E3		
E4	00	
E5	00	
E6	00	
E7	00	
E8	00	
E9	00	
EA	00	
EB	00	
EC	00	
ED	00	
EE	00	
EF	00	

Table 7-3-2. (5)

3-2. POWER SYSTEM ADJUSTMENTS

1. Power Voltage Check (DD-76 board)

Mode	Camera record
Subject	Arbitrary
Measuring Instrument	Digital voltmeter
D5V check	
Measurement Point	Pin ㉙ of CN901
Specified Value	4.9 ± 0.1 Vdc
EVF5V check	
Measurement Point	Pin ㊴ of CN901
Specified Value	4.9 ± 0.1 Vdc
VID 5V check	
Measurement Point	Pins ㉓ and ㉔ of CN901
Specified Value	4.9 ± 0.1 Vdc
AU 5V check	
Measurement Point	Pin ㉟ of CN901
Specified Value	4.9 ± 0.1 Vdc
RP 5V check	
Measurement Point	Pin ⑳ of CN901
Specified Value	4.9 ± 0.1 Vdc
CAM5V check	
Measurement Point	Pins ㉕ and ㉖ of CN901
Specified Value	4.85 ± 0.1 Vdc
SS 3.6V check	
Measurement Point	Pin ㉝ of CN901
Specified Value	3.6 ± 0.1 Vdc
D3.6V check	
Measurement Point	Pins ㉑ and ㉒ of CN901
Specified Value	3.6 ± 0.1 Vdc
CAM 15V check	
Measurement Point	Pin ㉗ of CN901
Specified Value	15 ± 0.3 Vdc
CAM –8.5V check	
Measurement Point	Pin ㉛ of CN901
Specified Value	$-8.5^{+0.25}_{-0.4}$ Vdc
MT 5V check	
Measurement Point	Pins ⑨, ⑱ and ⑲ of CN901
Specified Value	5.0 ± 0.1 Vdc

3-3. SYSTEM CONTROL SYSTEM ADJUSTMENTS

1. Page D Initial Value Input

If the page D data has been erased due to some cause, input the page D initial value before performing adjustments. For details on the initial value, refer to "Page D address list" in "3-1-8. Service Mode".

Mode	E-E
Signal	Arbitrary
Adjustment Page	D
Adjustment Address	00 to 90

Input method:

1) Set data: 01 to page: 1, address: 01.
2) Select page D, and input the initial value to each address. (After setting the data (initial value), be sure to press the PAUSE button of the adjusting remote commander before changing the address.)

2. Battery End Adjustment

Set the battery end voltage.
If the voltage is incorrect, the life of the battery will shorten.
The image at the battery end will also be rough.

Mode	Camera record
Signal	Arbitrary
Measurement Point	LCD display of the adjusting remote control unit
Measuring Instrument	
Adjustment Page	D
Specified Value	06, 07, 08, 09, 0A

Connection:

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-5.

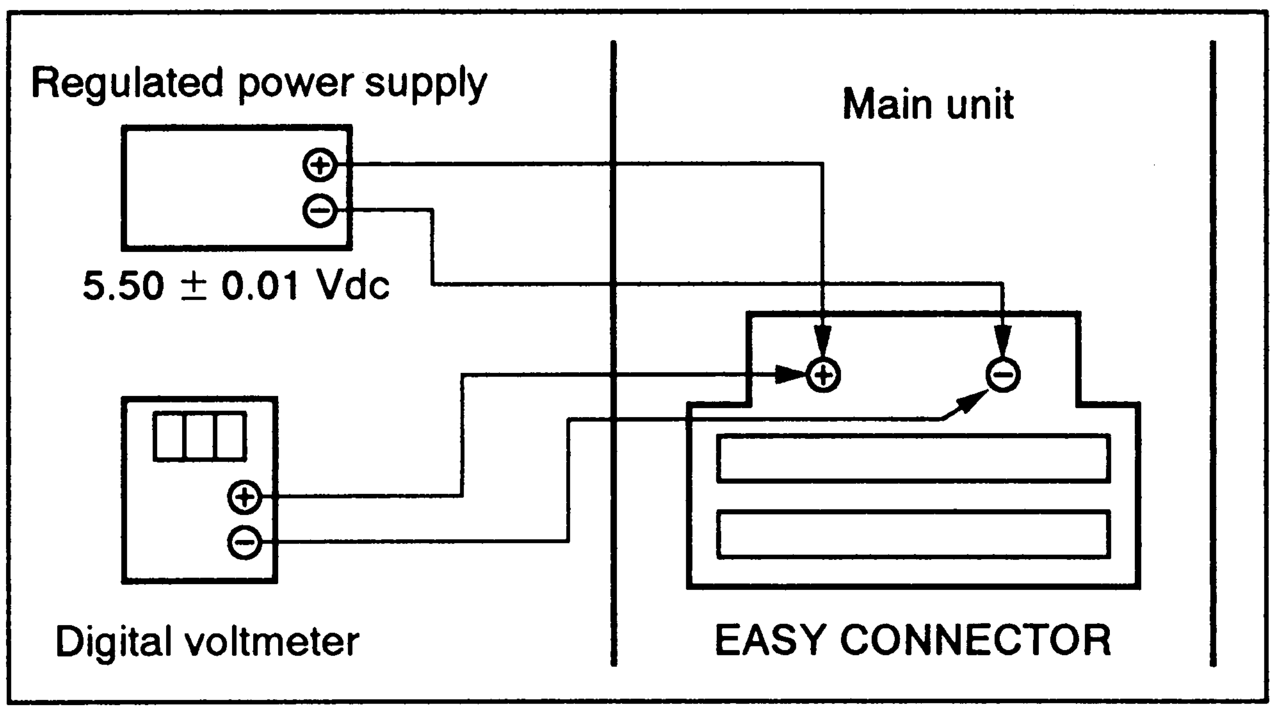


Fig. 7-3-5.

Adjusting method:

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display is 6.3 ± 0.1 Vdc.
2) Set data: 01 to page: 1, address: 00.
3) Decrease the output voltage of the regulated power supply so that the digital voltmeter display is 5.50 ± 0.01 Vdc.
4) Set data: 01 to page: 2, address: 00.
5) Select page: 2, address: 49, read the adjusting remote commander display data, and set to D_6.
6) Set data D_6 to page: D, address: 06, and press the PAUSE button of the adjusting remote commander.
7) Convert D_6 to decimal notation, and obtain D_6'. (Refer to Table 7-1-3. "Hexadecimal notation–decimal notation conversion table")
8) Calculate D_7', D_8', D_9' and D_A' using following equations (decimal notation calculation).
   $D_7'=D_6'+3$
   $D_8'=D_6'+8$
   $D_9'=D_6'+14$
   $D_A'=D_6'+18$
9) Convert D_7', D_8', D_9' and D_A' to hexadecimal notation, and obtain D_7, D_8, D_9 and D_A.
10) Set data: D_7' to page: D, address: 07, and press the PAUSE button of the adjusting remote commander.
11) Set data: D_8' to page: D, address: 08, and press the PAUSE button.
12) Set data: D_9' to page: D, address: 09, and press the PAUSE button.
13) Set data: D_A to page: D, address: 0A, and press the PAUSE button.
14) Perform "Battery Down Check".

3. Battery Down Check

Mode	Camera record
Subject	Arbitrary

Connection

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 7-3-5.

Checking method:

Remove the adjusting remote commander, and perform the following check. If the check is not satisfied, perform from the beginning again.

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display becomes 6.3 ± 0.1 Vdc.
2) Set to the camera recording mode.
3) Check that the 🔋 mark on the EVF (viewfinder) display is not lighted up. (TALLY lamp lights up).
4) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.53 ± 0.01 Vdc.
5) Check that the 🔋 mark on the EVF display and the TALLY lamp blinks every second.
6) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.47 ± 0.01 Vdc.
7) Check that the 🔋 mark on the EVF display and the TALLY lamp are blinking faster.

3-4. SERVO SYSTEM ADJUSTMENTS

1. Switching Position Adjustment (VS-123 board)

If deviated in this case causes switching noise or jitter on the played back screen.

Mode	Playback
Signal	Alignment tape: For tracking adjustment (WR5-1NP)
Measurement Point	CH1: Pin ④ of CN102 (RF SWP) CH2: Pin ③ of CN102 (PB RF)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	04, 05
Specified Value	t1=0 ± 10 μsec

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Set data: 0B to page: D, address: 05.
3) Change the data of page: D, address: 05 and minimize "t1". (Coarse adjustment)
4) Change the data of page: D, address: 04, and adjust so that the switching position (t1) becomes the specified value. (Fine adjustment)
5) Press the PAUSE button of the adjusting remote commander.

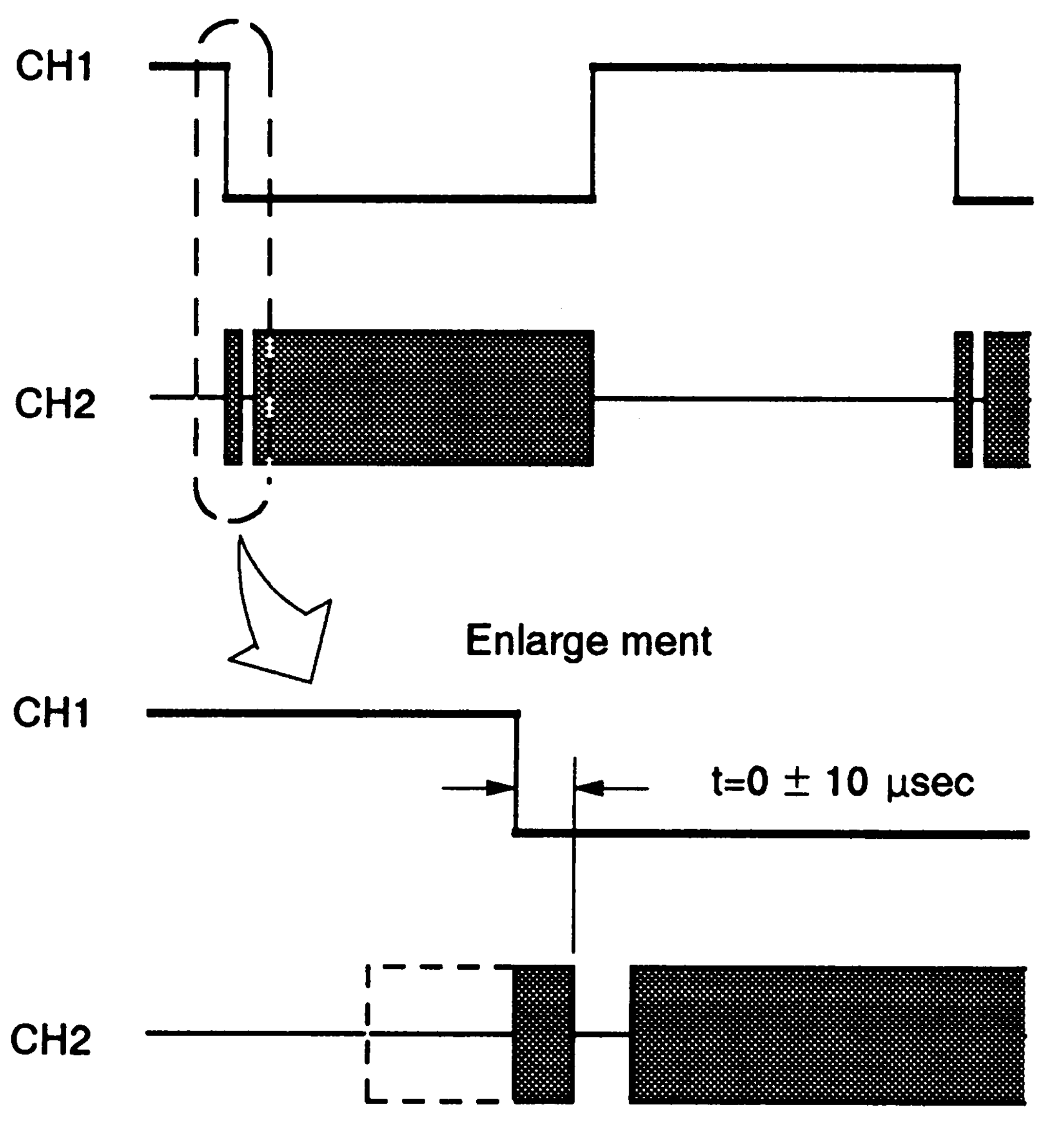


Fig. 7-3-6.

3-5. VIDEO ADJUSTMENTS

The adjustments of the video system must be performed according to the following adjustment procedure.
The color video signal supplied from the pattern generator is used as the video input signal for adjusting the video system in recording mode. Check that the sync signal and the color burst signal satisfy the specification specified during the adjustment set-up shown in Figs. 7-3-2. and 7-3-3.

[Adjusting procedure]

1) Playback frequency characteristics adjustment
2) Flying erase check
3) VXO oscillation frequency check
4) SYNC AGC level adjustment
5) Comb filter adjustment
6) Emphasis input level adjustment
7) DE EMPH level adjustment
8) PB Y out level adjustment
9) Y FM carrier frequency adjustment
10) Y FM deviation adjustment
11) Chroma emphasis adjustment 1
12) Chroma emphasis adjustment 2
13) Comb filter fine adjustment
14) REC Y level adjustment
15) REC L adjustment
16) REC CHROMA level adjustment
17) REC ATF level check

1. Playback Frequency Characteristic Adjustment (VS-123 board)

Eliminate the differences in the head characteristics of each channel. If there are differences, flickers and over modulation noises will be produced.

Note 1: The adjusting element for CH2 is shown in parentheses [ ].

Mode	Playback
Signal	Alignment tape: For frequency characteristic adjustment (WR5-6N)
Measurement Point	CH1: Pin ③ of CN102 (PB RF) EXT TRIG: Pin ④ of CN102 (RF SWP)
Measuring Instrument	Oscilloscope TRIG SLOPE: +, [–]
Adjustment Page	D
Adjustment Address	5E, [63]
Specified Value	3.58 MHz level: 5.5 MHz level= 4: (3 ± 0.3)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of address: 5E [63] of page D, and adjust the level ratio of 3.58 MHz and 5.5 MHz of PB RF output waveform to the specified value.

Note 2: After each address adjustment, be sure to press the PAUSE button of the adjusting remote commander and memorize the data.

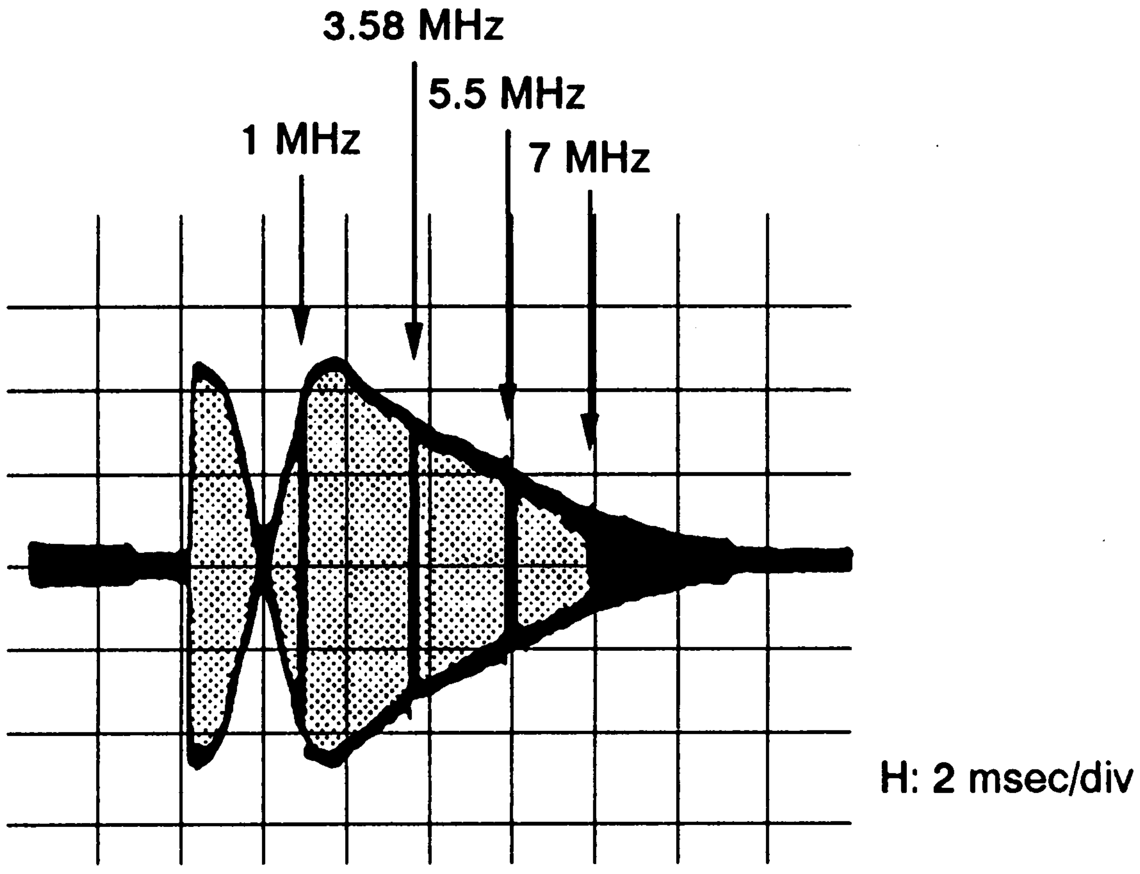


Fig. 7-3-7.

2. Flying Erase Check (VS-123 board)

Mode	Camera record
Signal	Arbitrary
Measurement Point	Pin ⑫ of CN101 (FE (X))
Measuring Instrument	Oscilloscope and frequency counter
Specified Value	Frequency: 8.0 ± 0.5 MHz Voltage: 6.0 ± 1 Vp-p (ME tape) Above 7.0 Vp-p (MP tape)

Checking method:

1) Check that the oscillation frequency and the oscillation voltage satisfieds the specified value.

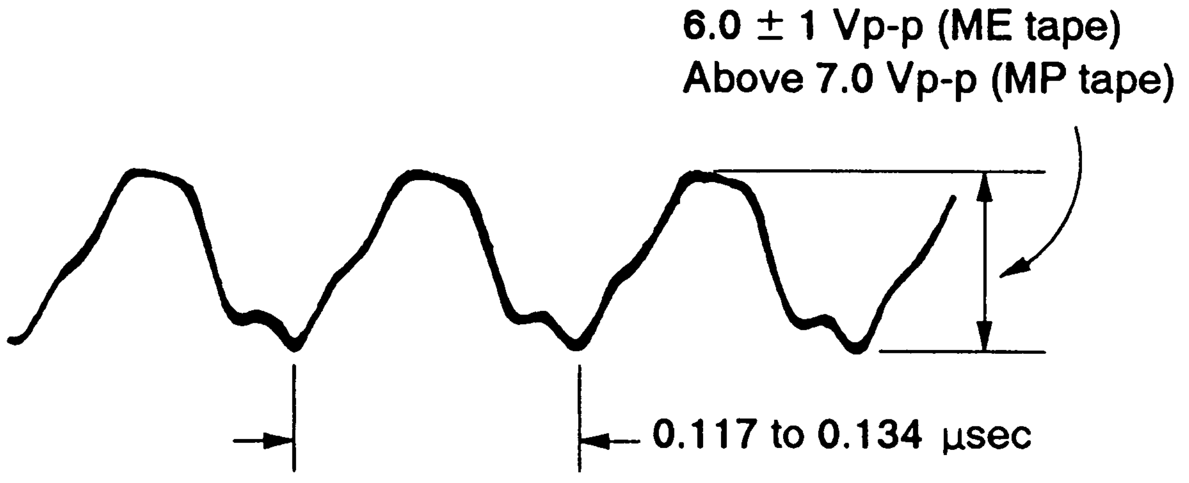


Fig. 7-3-8.

3. VXO Oscillation Frequency Check (VS-123 board)

Mode	Playback
Signal	Color bar
Measurement Point	Pin (61) of IC201 (CL227)
Measuring Instrument	Frequency counter
Specified Value	3579545 ± 50 Hz

Note: Connect the frequency counter via a high impedance (approximately 10 MΩ) and low capacity (below 10 pF) buffer.

Adjusting method:

1) Check that the oscillation frequency of pin (61) of IC201 is 3579545 ± 50 Hz.

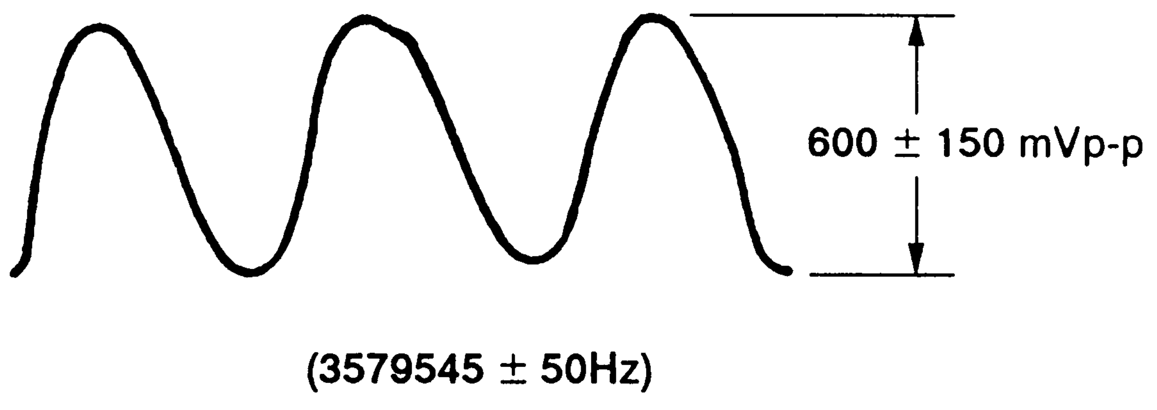


Fig. 7-3-9.

4. SYNC AGC Level Adjustment (VS-123 board)

Adjust so that the Y signal level to be recorded becomes consistent. If it is not consistent, the camera EE image and OA image will be brighter or darker than normal.

Mode	Camera record
Signal	Color bar (Camera input) Note 1
Measurement Point	Pin ⑥ of CN201 (VIDEO I/O) Note 2 (CL298)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	70
Specified Value	A=1.00 ± 0.025V

Note 1: The chroma signal input is not required.

Note 2: Terminate the video out terminal at 75Ω.
75Ω resistor (Part code: 1-247-804-11)

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 70, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

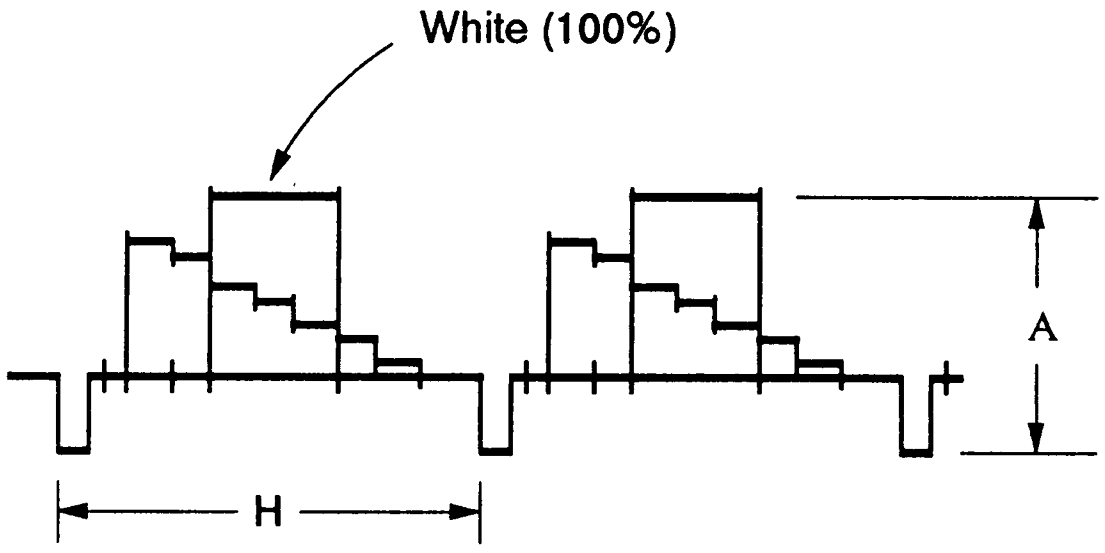
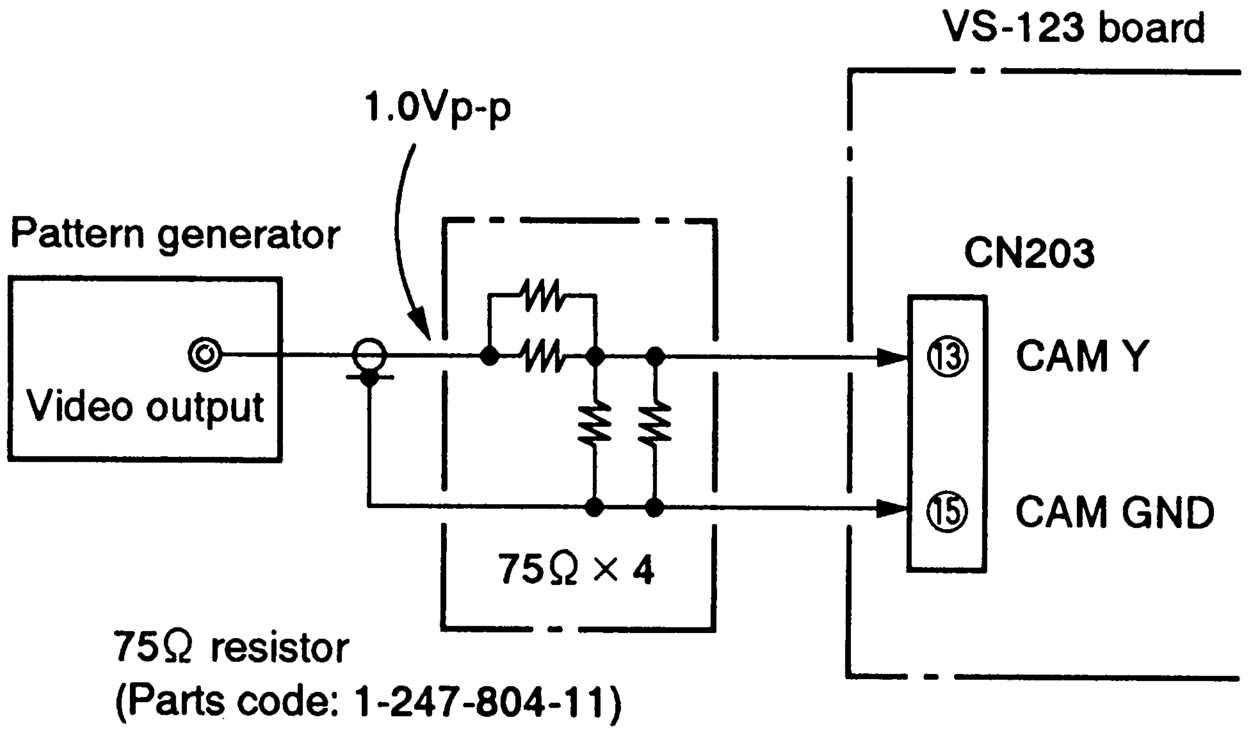


Fig. 7-3-10.

5. Comb Filter Adjustment (VS-123 board)

Mode	Record
Signal	Color bar (Note 1)
Measurement Point	Pin ⑭ of IC201 (Y COMB OUT)
Measuring Instrument	Oscilloscope
Adjusting Element	RV202 (PHASE)
Adjustment Page	D
Adjustment Address	71
Specified Value	Residual chroma component (A) is minimum.

Note 1: Connect the pattern generator as shown in the following figure.

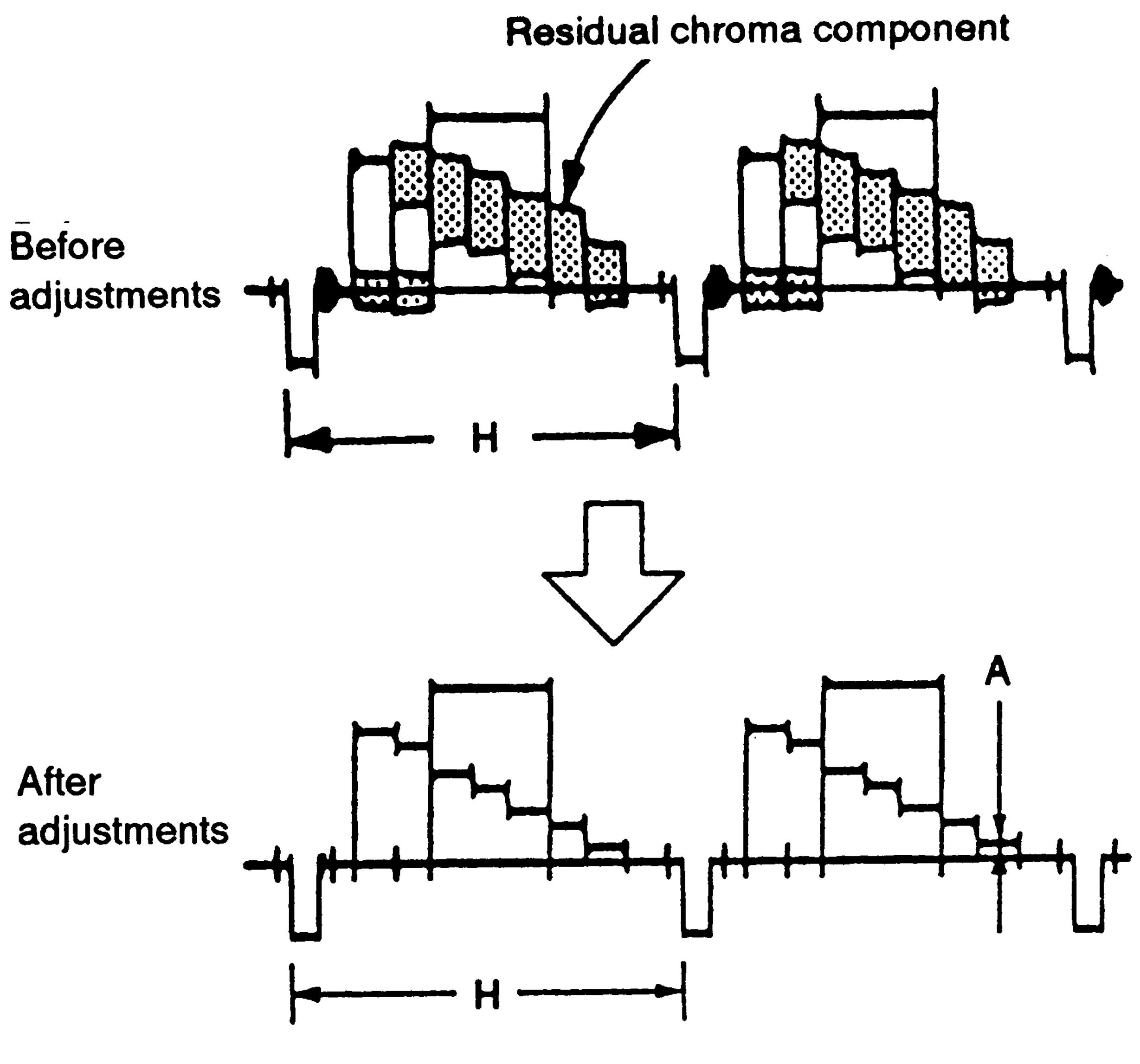


Adjusting method:

1) Set to the VIDEO input mode.
2) Set to the record mode.
3) Set data: 01 to page: 1, address: 00.
4) Set data: 00 to page: 2, address: 00.
5) Set data: 04 to page: 2, address: B0.
6) After memorizing the data of address: 9A of page: 2, set data: 10 to the address.
7) After memorizing the data of address: 9D of page: 2, set data: 30 to the address.
8) Change the data of page: D, address: 71, and adjust the residual chroma component (A) to minimum.
9) Adjust RV202 so that the residual chroma component becames minimum.
10) Repeat 8) and 9).
11) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set the data memorized at step 7) to address: 9D of page: 2.
2) Set the data memorized at step 6) to address: 9A of page: 2.
3) Set data: 00 to page: 2, address: B0.



Residual chroma component
Before adjustments
H
After adjustments
A
H

Fig. 7-3-11.

6. Emphasis Input Level Adjustment (VS-123 board)

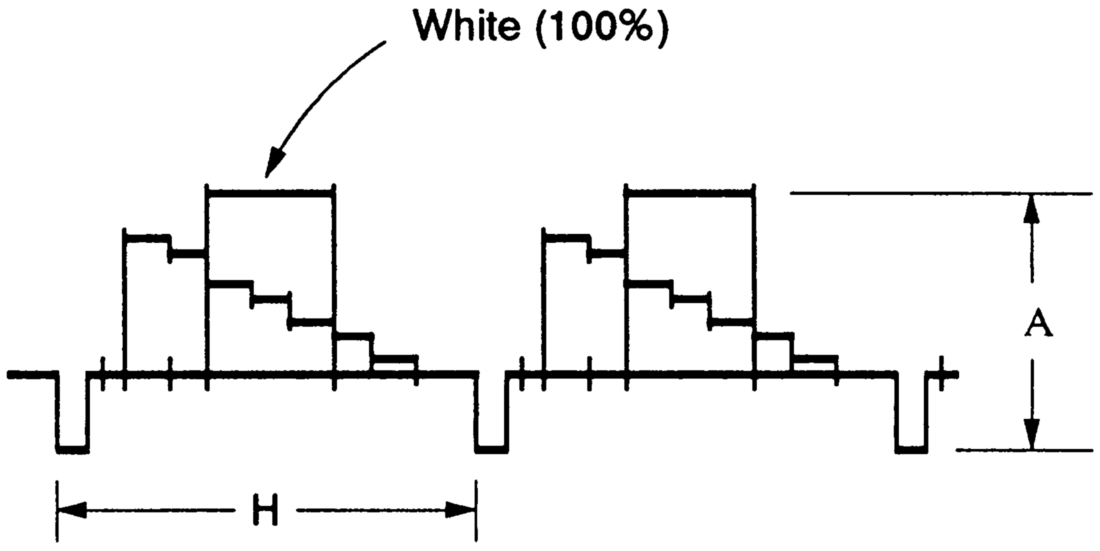
Y level of emphasis circuit setting. If deviated, this causes too bright or too dark image during play back after recording.

Mode	Camera record
Signal	Color bar (CAMERA input)
Measurement Point	Pin ⑤ of IC201 (EMPH IN) or Pin ⑤ of IC205 (CL204)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	82
Specified Value	A=0.50 ± 0.01V

Note 1: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 82, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.



White (100%)
A
H

Fig. 7-3-12.

7. DE EMPH Level Adjustment (VS-123 board)

De-emphasis input level setting. If deviated, this causes excessive brightness or darkness.

Mode	Playback
Signal	Alignment tape: For checking operations Color bar section (WR5-5NSP)
Measurement Point	Pin ㉓ of IC201 (DL IN 1) (CL215)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	87
Specified Value	A=0.54 ± 0.01V

Note 1: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 87, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Perform "PB Y OUT Level Adjustment".

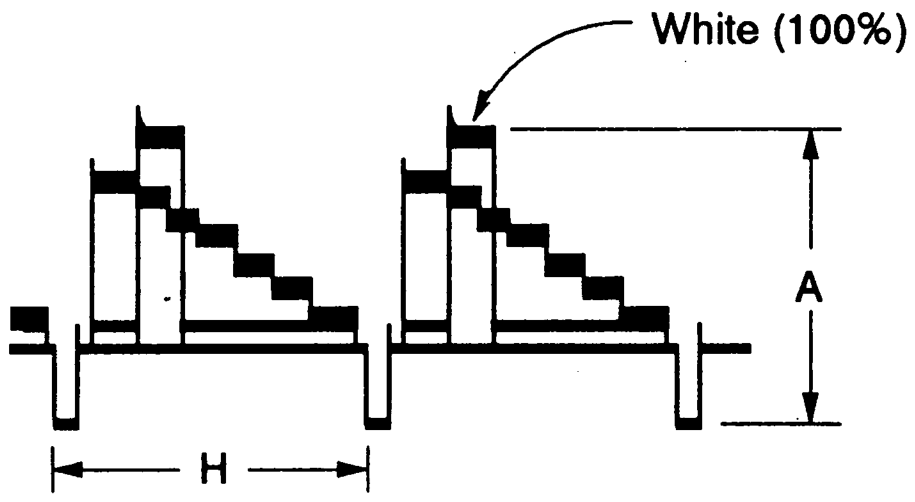


Fig. 7-3-13.

8. PB Y OUT Level Adjustment

PB LINE OUT Y level setting. If deviated, this causes too bright or too dark picture.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Pin ⑥ of CN201 (VIDEO I/O)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	83
Specified Value	A=1.0 ± 0.05V

Note 1: Terminate the video out terminal at 75Ω .
75Ω resistor (Part code: 1-247-804-11)

Note 2: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 83, and adjust so that the video signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

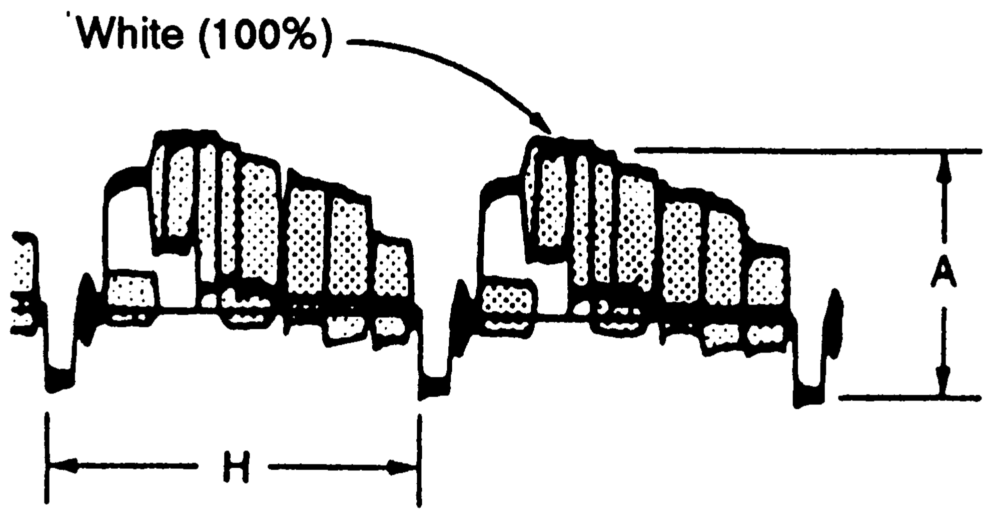


Fig. 7-3-14.

9. Y FM Carrier Frequency Adjustment (VS-123 board)

FM carrier frequency of REC Y setting. If deviated, this caused blurred played back picture or deteriorated resolution.

Mode	Record
Signal	No signal (CAMERA input)
Measurement Point	Pin ㊴ of IC201 (Y RF OUT) (CL304)
Measuring Instrument	Frequency counter
Adjustment Page	D
Adjustment Address	75
Specified Value	4.39 ± 0.01 MHz

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 75, and adjust so that the Y FM carrier frequency becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.

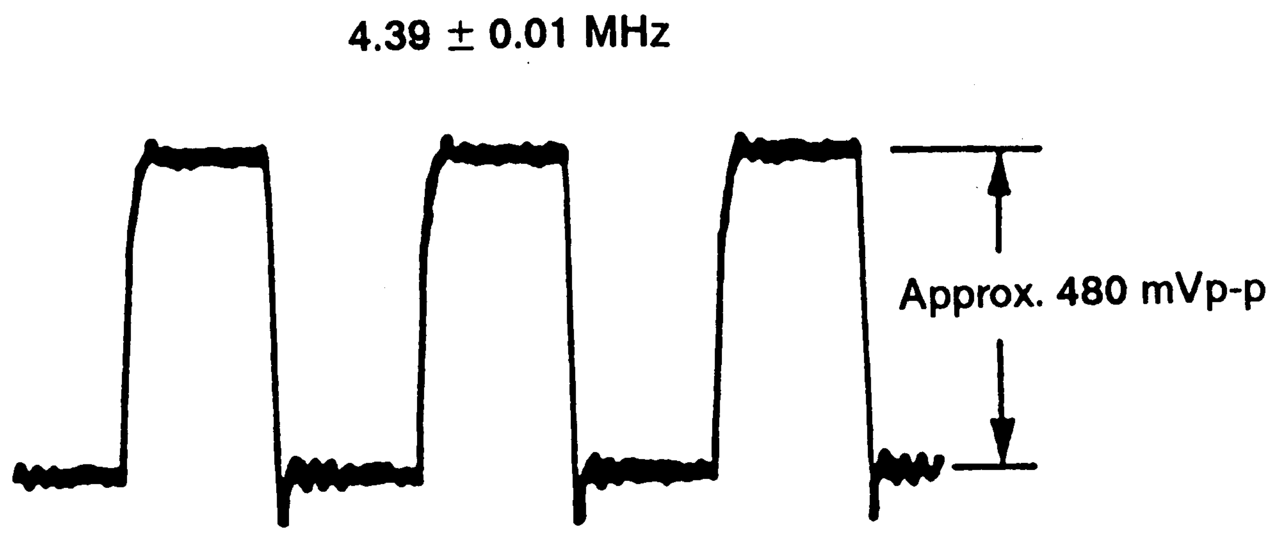


Fig. 7-3-15.

10. Y FM Deviation Adjustment (VS-123 board)

FM deviation of REC Y setting. If deviated, this causes too bright/dark image, or marked occurrence of black picture or deteriorated resolution.

Mode	Record and playback
Signal	Color bar (CAMERA input)
Measurement Point	Pin ㉓ of IC201 (DL IN 1) (CL215)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	77
Specified Value	A=0.54 ± 0.01V

Note 1: Check that "Emphasis Input Level Adjustment", have been completed.

Note 2: The chroma signal input is not required.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Record the color bar signal.
3) Playback the recorded signal.
4) Check the playback signal level (A).
   Specification:A=0.54 ± 0.01V
5) If the specification is not satisfied, change the data of page: D, address: 77, and repeat steps 2) to 4).

Playback signal level	Changing the data
When smaller than the specified value	Increase
When bigger than the specified value	Decrease

6) Press the PAUSE button of the adjusting remote commander.
7) Perform "Y FM Carrier Frequency Adjustment".

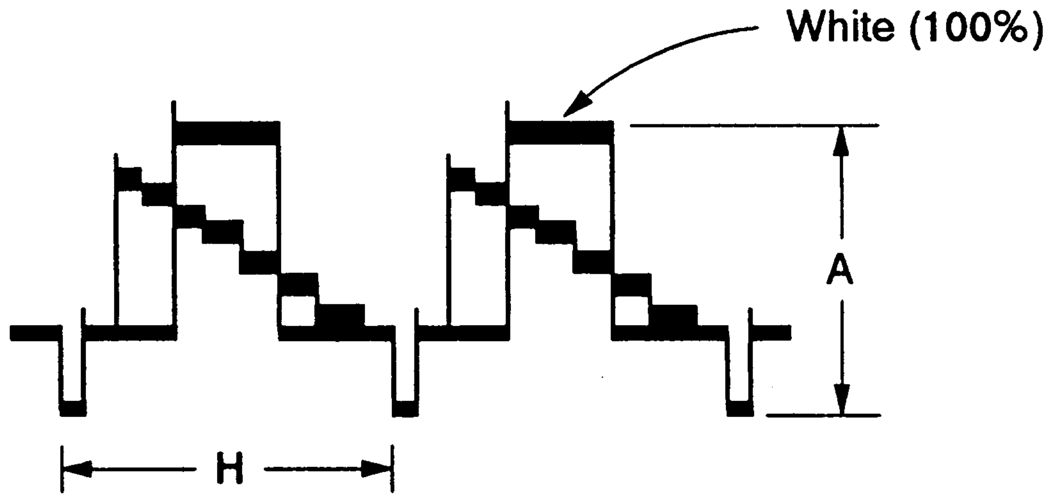


Fig. 7-3-16.

11. Chroma Emphasis Adjustment 1 (VS-123 board)

Emphasis center frequency setting. If deviated, this causes unnatural color.

Mode	Record
Signal	Color bar (CAMERA input)
Measurement Point	Pin ⑧ of IC201 (REC C OUT) (CL216)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	80 81
Specified Value	Minimum fo component

Adjusting method:

1) Set to the record mode.
2) Set data: 01 to page: 00, address: 01.
3) Set data: 00 to page: 2, address: 00.
4) Set data: 04 to page: 2, address: B0.
5) After memorizing the data of address: 9A of page: 2, set data: 02 to the address.
6) Change the data of page: D, address: 80, and adjust so that the amplitude of the latter section of the chroma signal (yellow section) becames minimum.
7) Press the PAUSE button of the adjusting remote commander.
8) Set the same data as address: 80 of page: D to address: 81 of page D.
9) Press the PAUSE button of the adjusting remote commander.

Processing after completing adjustments

1) Set the memorized at step 5) to address: 9A of page: 2.
2) Set data: 00 to page: 2, address: B0.

Minimize the amplitude of the latter section of the yellow section.

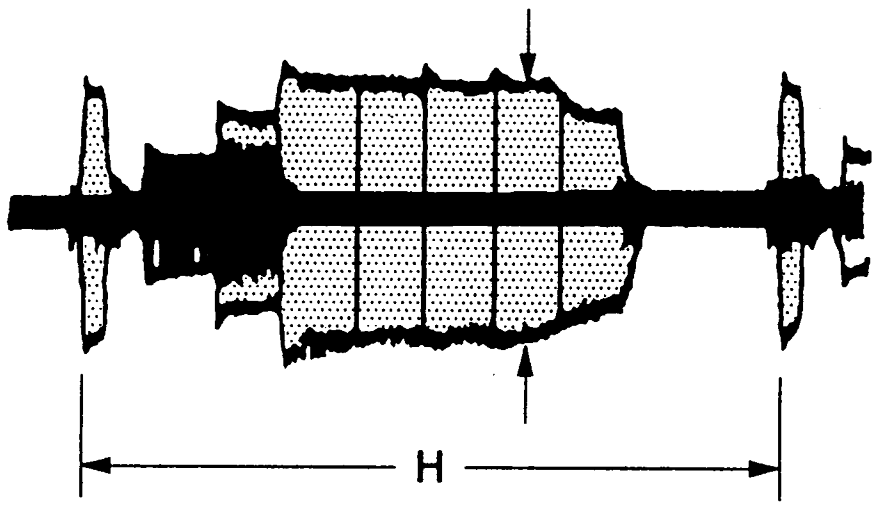


Fig. 7-3-17.

12. Chroma Emphasis Adjustment 2 (VS-123 board)

Emphasis center frequency setting. If deviated, this causes unnatural color.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	D
Adjustment Address	81 80
Specified Value	The path from the blue luminance point to black luminance point should be a straight line.

Adjusting method:

1) Set data: 01 to page: 00, address: 01.
2) Change the data of page: D, address: 81, and adjust so that the path from the blue luminance point to black luminance point becames a straight line.
3) Press the PAUSE button of the adjusting remote commander.
4) Set the same data as address: 81 of page: D to address: 80 of page: D.
5) Press PAUSE button of the adjusting remote commander.

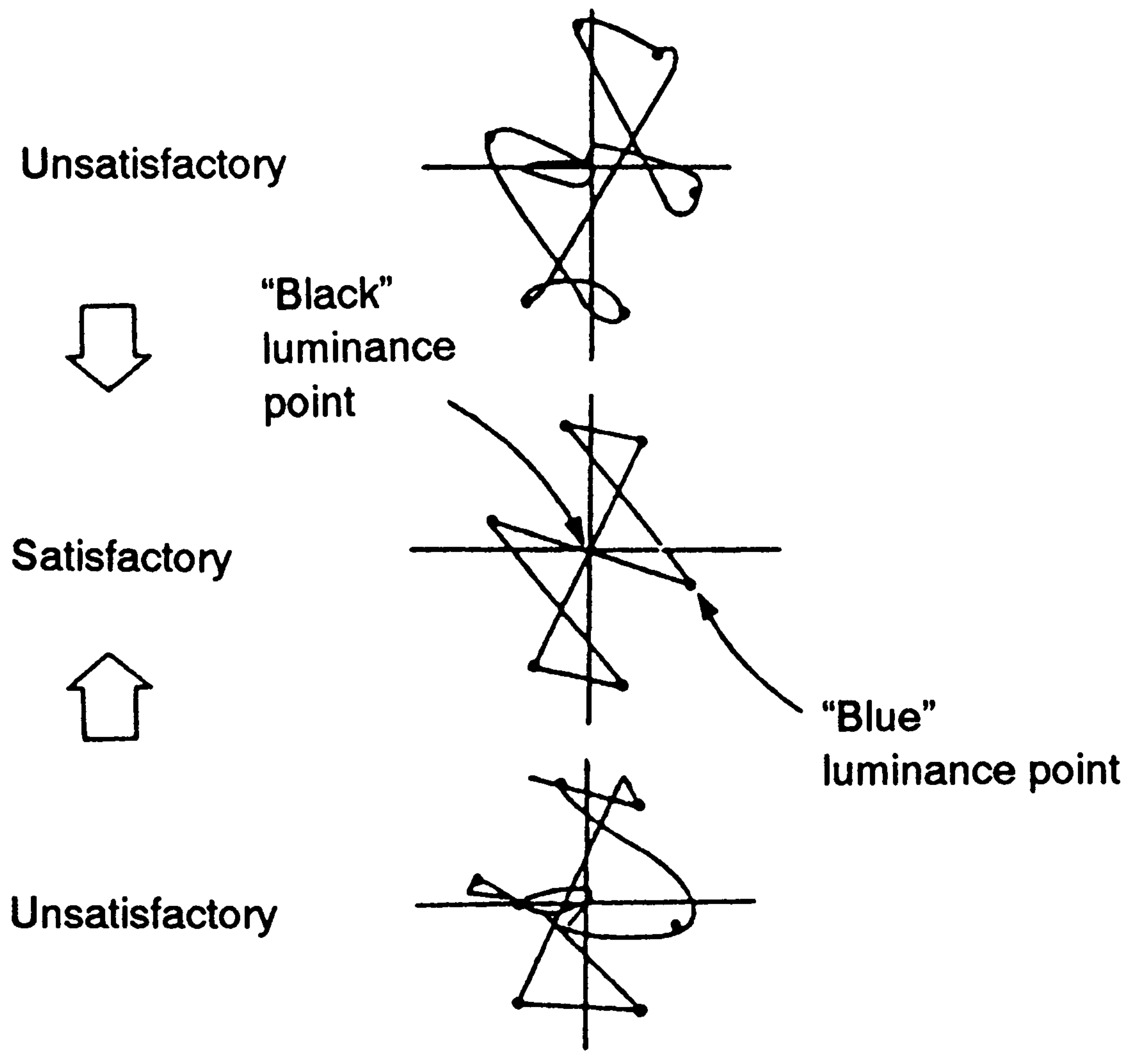


Fig. 7-3-18.

13. Comb Filter Fine Adjustment (VS-123 board)

Set the level and phase of the 1H delayed signal for the comb filter. If deviated, this causes marked occurrence of beets in played back picture.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjusting Element	RV202 (PHASE)
Adjustment Page	D
Adjustment Address	71
Specified Value	Minimum color luminance point movement when the "Edit" switch is turned on/off

Note 1: Turn the edit ON/OFF at the menu screen.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Minimize the movements of the color luminance point when the edit is on/off with RV202.
3) Change the data of page: D, address: 71 and minimize the movements of the color luminance point when the edit is on/off
4) Press the PAUSE button of the adjusting remote commander.
5) Repeat steps 2) to 4).

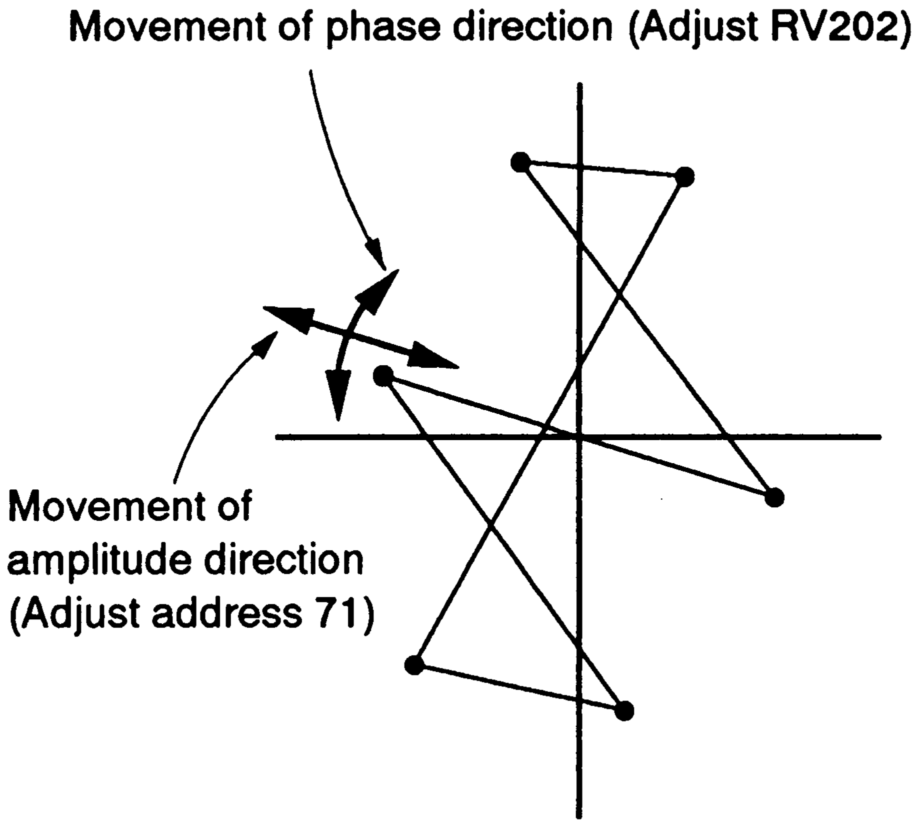

Movement of phase direction (Adjust RV202)
Movement of amplitude direction (Adjust address 71)

Fig. 7-3-19.

14. REC Y Level Adjustment (VS-123 board)

Recording level of luminance signal setting. If deviated, this causes black stretch over modulation noise or color shade.

Mode	Record
Signal	No signal
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope Board width limit: 20 MHz
Adjustment Page	D
Adjustment Address	42, 43, 46, 47
Specified Value	A=145 ± 5 mVp-p

Note: Use a normal MP type tape.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 47, and adjust so that REC Y level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Set data to address: 42, 43, 46 of page: D as shown in following table.

(Be sure to press the PAUSE button of the adjusting remote commander after setting each data.)

Address	Data
42	Same data as address: 47
43	Same data as address: 47
46	Same data as address: 47

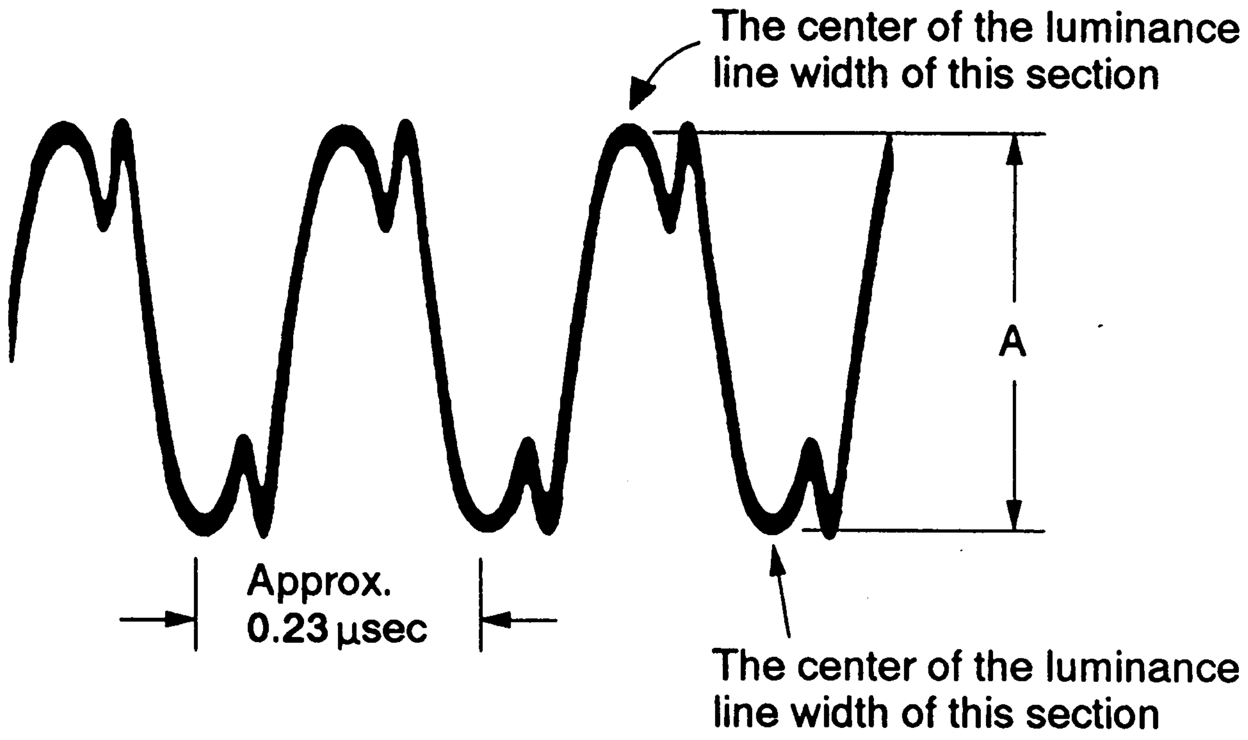

The center of the luminance line width of this section
A
Approx. 0.23 μsec
The center of the luminance line width of this section

Fig. 7-3-20.

15. REC L Adjustment (VS-123 board)

Set the recording levels of the REC AFM signal and REC ATF signal. If the level is too low, the audio S/N will deteriorate, tracking will not be stable, or SP/LP will not be discriminated properly. If too high, color beets will be produced on the self-recording/playback image.

Mode	Record
Signal	No signal (VIDEO input)
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	38, 39, 3A, 3B
Specified Value	A=8.4 ± 1.0 mVp-p

Note 1: Use a MP type tape.
Note 2: AU-182 board is required for this adjustment.

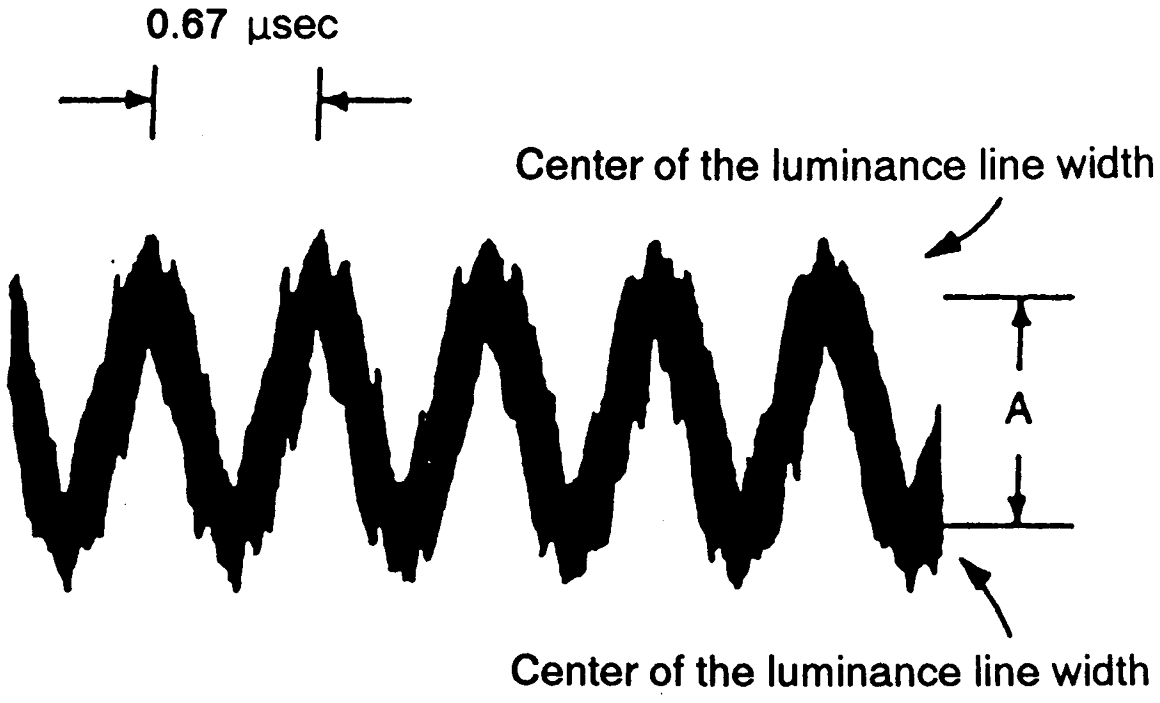


Fig. 7-3-21.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Connect Pin ⑤ of IC508 and GND with a 0.01 μF capacitor.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 3B, and adjust so that the REC AFM signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Read the data of page: D, address: 3B, and set to D3B.
5) Set data: D3B to address: 39 of page D.
6) Press the PAUSE button of the adjusting remote commander.
7) Convert D3B to decimal notation, and obtain D3B′.
   (Refer to Table 7-1-3. "Hexadecimal notation-decimal notation conversion table")
8) Culculate D3A′ using following equation (decimal notation calculation).
   D3A′=D3B′−7
9) Convert D3A′ to hexadecimal notation, and obtain D3A.
10) Set data: D3A to address: 3A of page D.
11) Press the PAUSE button of the adjusting remote commander.
12) Set data: D3A to address: 38 of page D.
13) Press the PAUSE button of the adjusting remote commander.
14) Perform "REC CHROMA Level Adjustment".

16. REC CHROMA Level Adjustment (VS-123 board)

Set REC CHROMA signal level. If it is lower than its normal level, chroma signal noise in played back picture will increase. If it is set higher, Y signal noises will increase and white modulation noises will be prodused.

Mode	Record
Signal	Color bar (VIDEO input)
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	33, 32, 37, 36
Specified Value	A=26 ± 3 mVp-p

Note 1: Use a MP type tape.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Connect Pin ⑤ of IC508 and GND with a 0.01 μF capacitor. (1-101-004-00)
3) Disconnect AU-182 board.

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 33, and adjust so that the REC CHROMA signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.
4) Read the data of page: D, address: 33, and set to D33.
5) Set data: D33 to address: 32 of page D.
6) Press the PAUSE button of the adjusting remote commander.
7) Set data: D33 to address: 36 of page D.
8) Press the PAUSE button of the adjusting remote commander.
9) Set data: D33 to address: 37 of page D.
10) Press the PAUSE button of the adjusting remote commander.

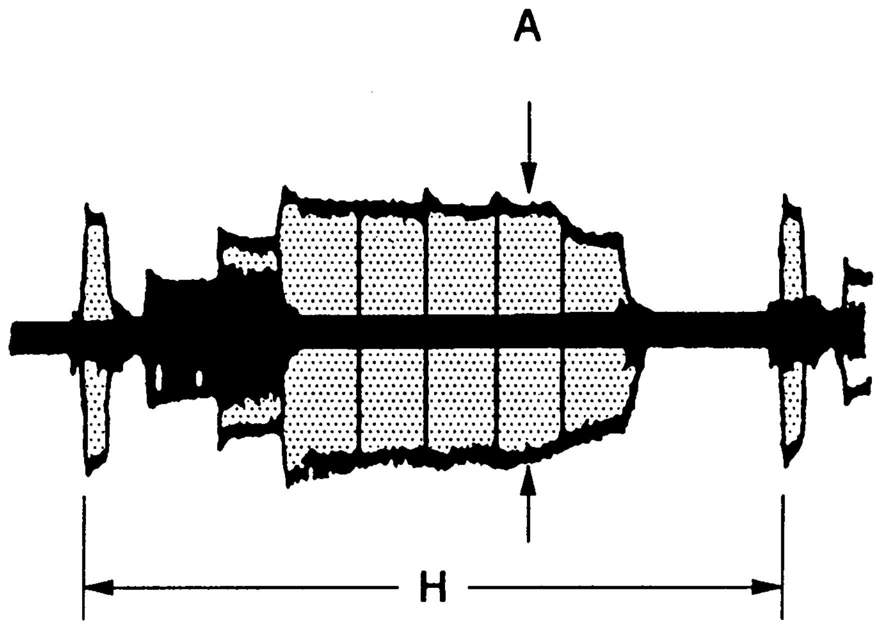


Fig. 7-3-22.

17. REC ATF Level Check (VS-123 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑥ of CN102 (REC 2)
Measuring Instrument	Oscilloscope
Specified Value	A=6.4 ± 1.5 mVp-p

Note 1: Use a MP type tape.

Connection:

1) Connect Emitter of Q113 and GND with a jumper wire.
2) Disconnect AU-182 board.

Adjusting method:

1) Check that the REC ATF signal level (A) satisfise the specified value.

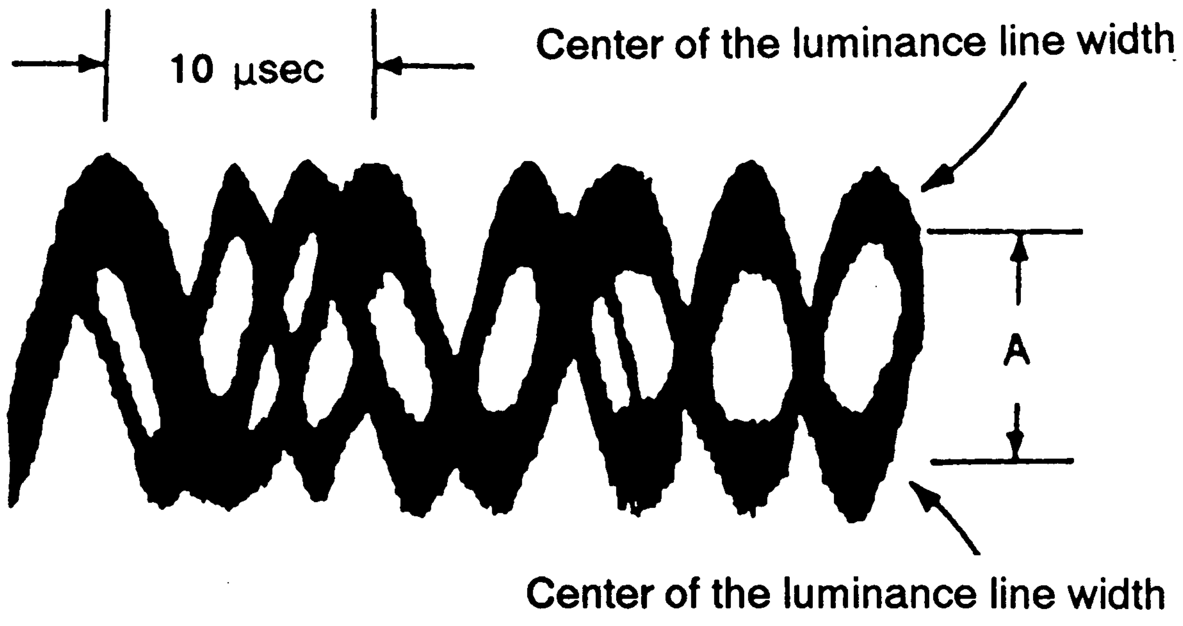


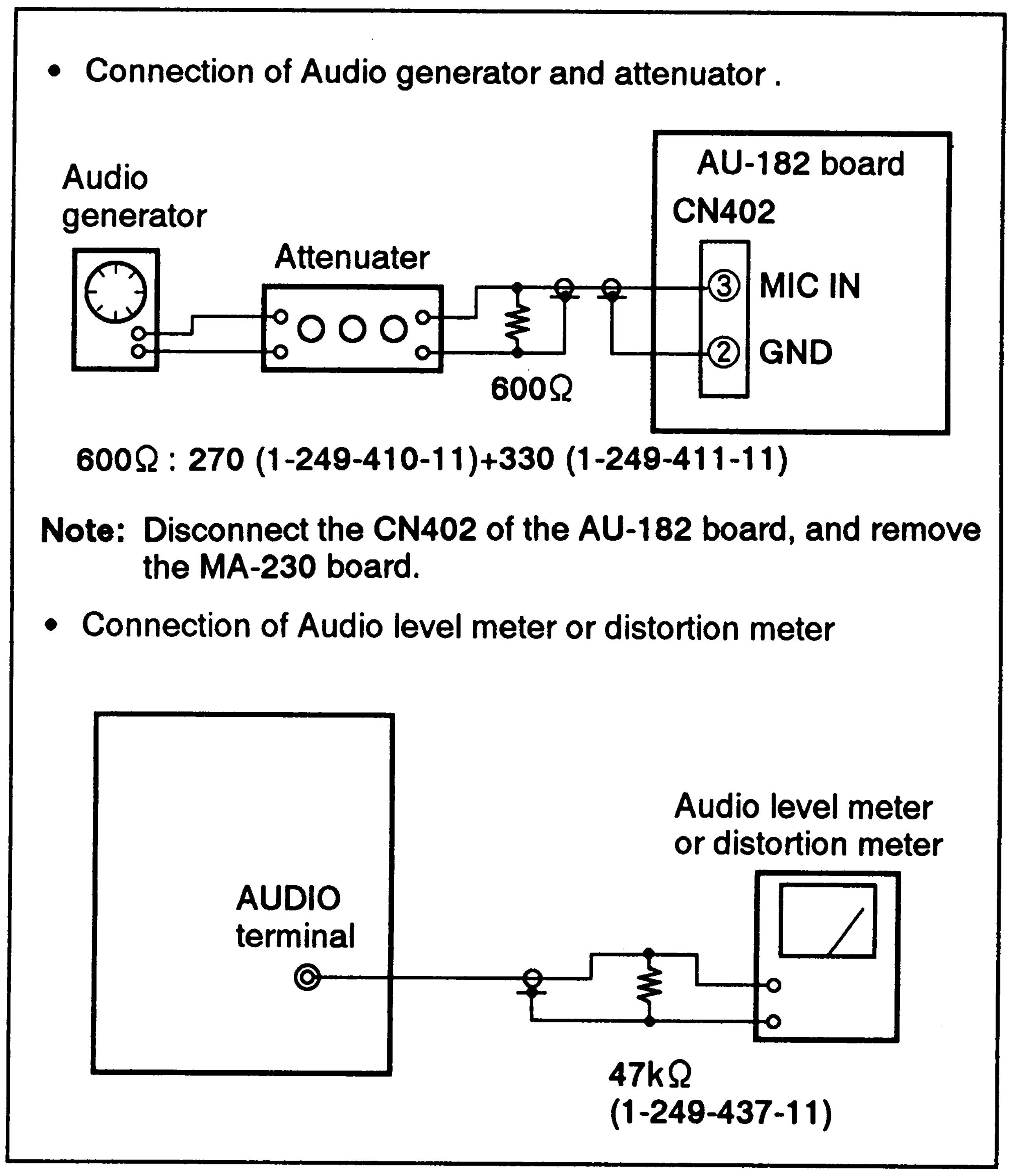
Fig. 7-3-23.

3-6. AUDIO SYSTEM ADJUSTMENT

[Connecting the measuring instruments for the audio]

Connect the audio system measuring instruments as shown in Fig. 7-3-24, and perform adjustments.

- Connection of Audio generator and attenuator.



600Ω : 270 (1-249-410-11)+330 (1-249-411-11)

Note: Disconnect the CN402 of the AU-182 board, and remove the MA-230 board.

- Connection of Audio level meter or distortion meter

Fig. 7-3-24.

[Adjustment Procedure]

1) E-E output level check
2) IR adjustment
3) Deviation adjustment
4) Carrier frequency check
5) Carrier level check
6) Overall level characteristics, distortion check
7) Overall noise level check

1. E-E Output Level Check (AU-182 board)

Mode	Camera recording
Signal	400 Hz, –38.5 dBs, Pin ③ of CN402 (MIC IN)
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 2 dBs

Checking method:

1) Check that the 400 Hz signal level satisfies the specified value.

2. IR Adjustment

Adjust to the optimum audio BPF characteristics of the IC.
If the characteristics is not correct, the distortion rate and S/N ratio will worsen.

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP)
Measurement Point	Audio output terminal
Measuring Instrument	Distortion meter
Adjustment Page	D
Adjustment Address	8E
Specified Value	Minimum distortion

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 8E and adjust so that the distortion is minimum.
3) Press the PAUSE button of the adjusting remote commander.

3. Deviation Adjustment

Adjust to the optimum audio FM signal deviation.
If the adjustment is not correct, its playback level will differ from that of other units.

Mode	Playback
Signal	Alignment tape: For checking the operation (WR5-5NSP)
Measurement Point	Audio output terminal
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	8F
Specified Value	–7.5 ± 0.5 dBs

Adjusting method:

1) Set data: 01 to page: 1, address: 00.
2) Change the data of page: D, address: 8F, and adjust so that the 400 Hz signal level becomes the specified value.
3) Press the PAUSE button of the adjusting remote commander.